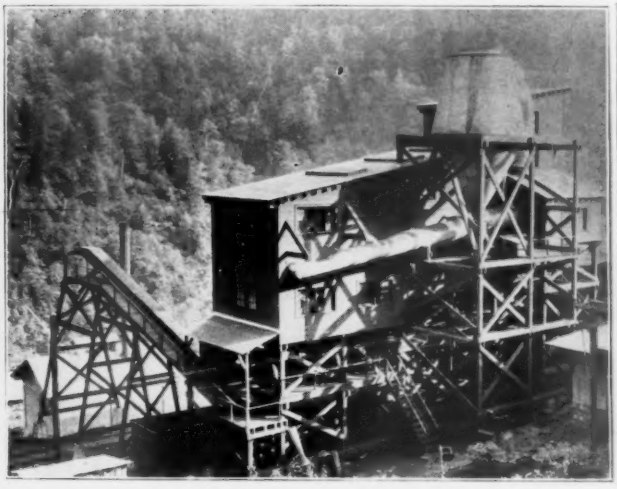
The MINING CONGRESS JOURNAL

Volume 12 JANUARY, 1926 *No.* 1

HAVE US TEST YOUR COAL BEFORE YOU DECIDE ON A CLEANING PROCESS



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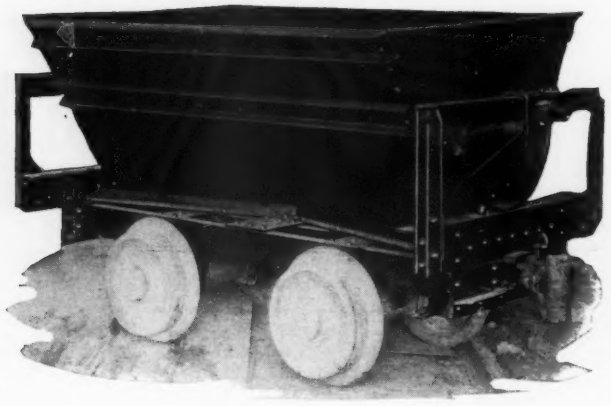
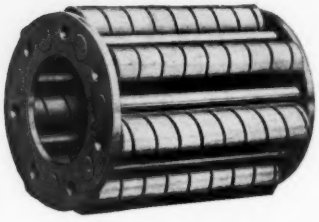


Hyatt Roller Bearing equipped cradle type car built by The Lake Shore Engine Works, Marquette, Michigan.



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To all who are cooperating with them in their efforts in behalf of the mining industry—to all interested in this work—to all members, committeemen, subscribers and advertisers

The American Mining Congress
and
The Mining Congress Journal

Extend their heartiest greetings and their wishes for

A Happy and Prosperous New Year

THE MINING CONGRESS JOURNAL

JANUARY, 1925

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PRACTICAL OPERATING MEN'S DEPARTMENT

COAL

Pneumatic Process For Cleaning Coal
The McComas Dry Concentration Plant
Pneumatic Coal Cleaning at Gulf Smokeless Coal Company
Dry Cleaning At Brilliant Mine
Dry Cleaning Plant of the Greenhill Mine, West Canadian Collieries, Ltd.

METAL

Essential Considerations In Selecting Method of Exploration
Exploration Methods In The Park City, Utah, District
Diamond Drilling Contrasted With Underground Workings For Mineral Exploration

Published Every Month by the American Mining Congress, Washington, D. C.

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Editor-in-Chief

E. R. COOMBES
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MCKINLEY W. KRIEGH
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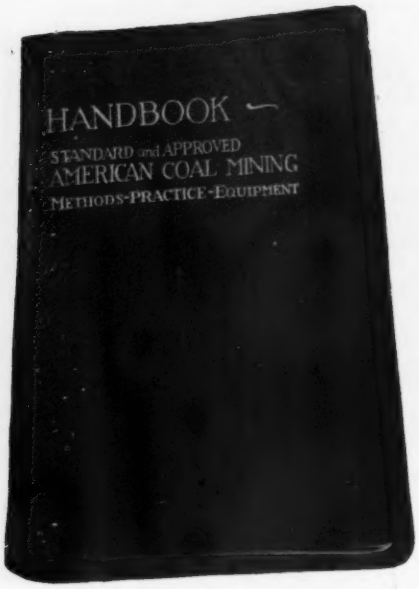
Entered as Second Class Mail Matter January 30, 1915, at the Post Office at Washington, D. C.

A Nation-Wide Movement
Between Its Covers



The book is pocket size, loose-leaf, and will be kept up to date as recommendations are approved. Its price is $5.00. This includes a subscription to THE MINING CONGRESS JOURNAL, which carries each month a department of practical operating problems.

A little book with a big purpose. This Handbook correlates for you, in working forms, applicable to your mine, the findings of the coal mining branch of the standardization movement. A book that makes coal mining more profitable; that is cooperatively backed by leading engineers and manufacturers of the country. Its treatment of the subjects listed below is a succession of hits at the high cost of mining. The book is made in loose-leaf form so that it can be kept up to date with supplementary reports. The world-wide demand for it indicates the growing strength of this movement.

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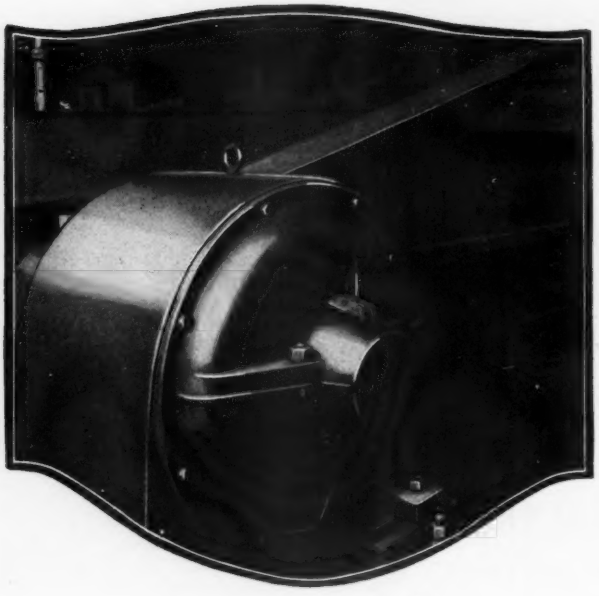
the first essential in cutting your coal "manufacturing" costs



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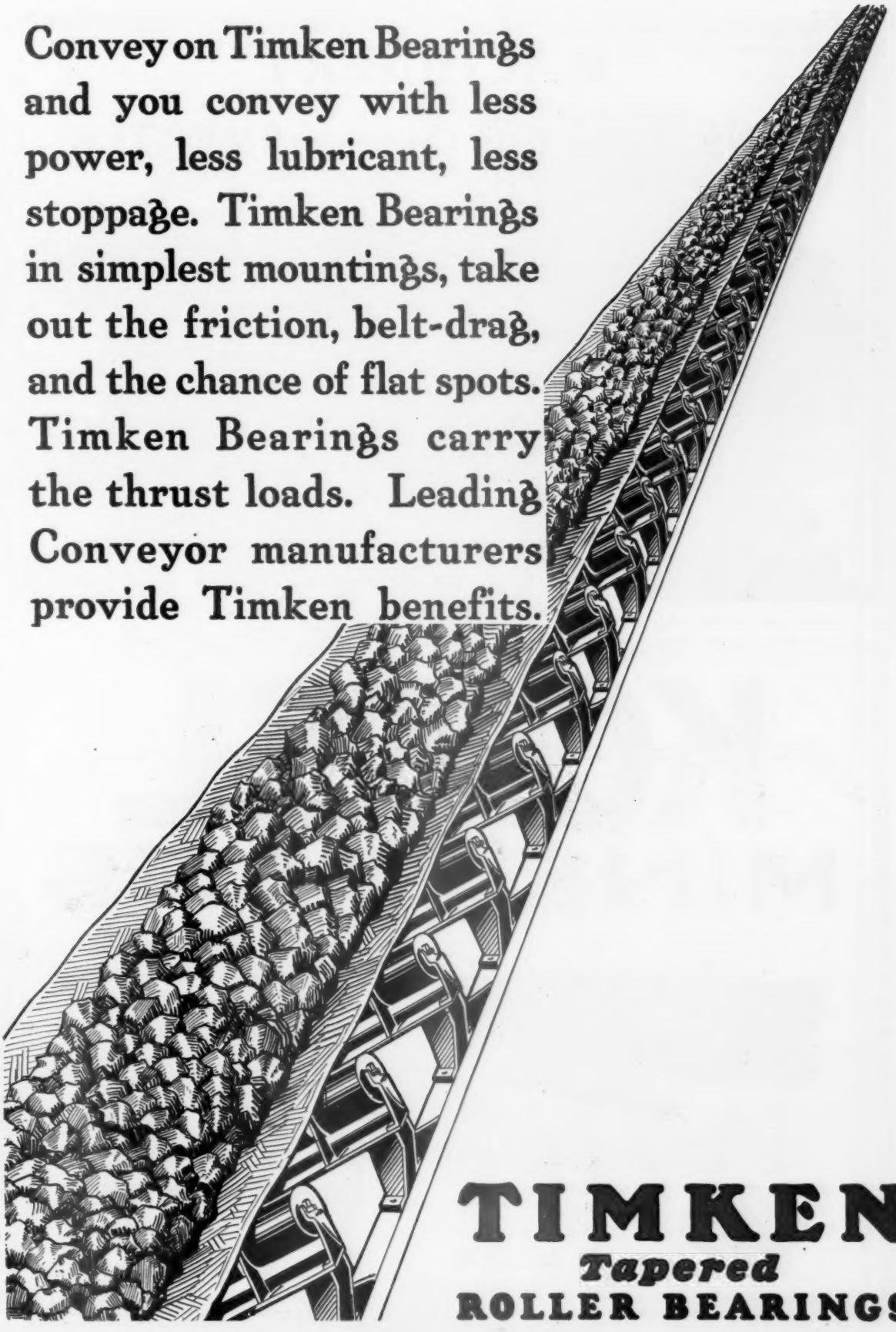

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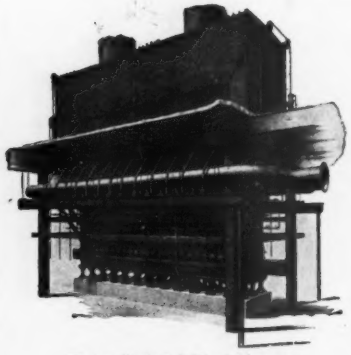
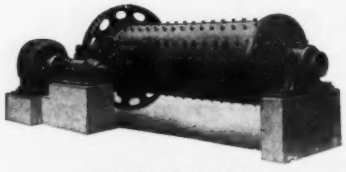


Water Jacketed Blast Furnace



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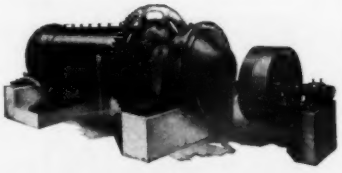

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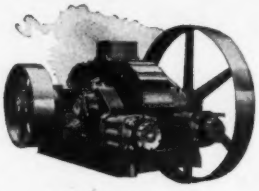
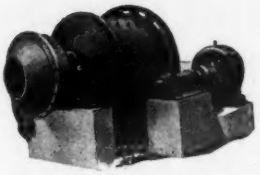


Crushing Rolls



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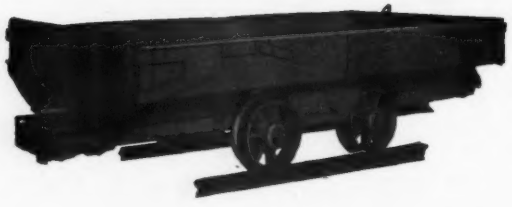

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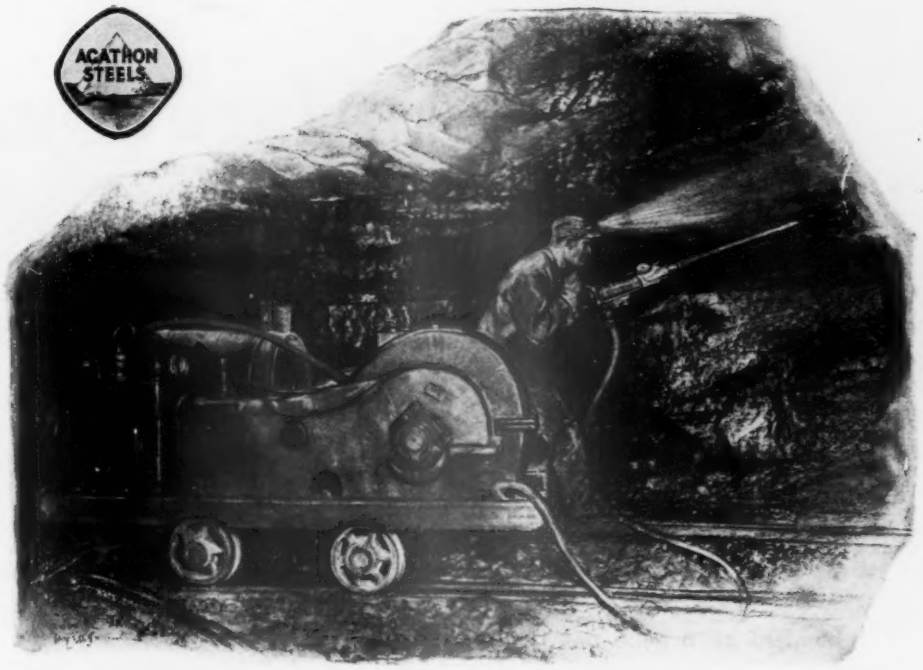

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UTAH has been described by competent engineers as the greatest mineralized area in the world. More than $1,000,000 a week is being taken from the ground in that state where mining is a chief industry. Since 1868 it has been one of the nation's leading metal-producing states, its output to date having a value of $1,350,000,000, from which dividends of approximately $250,000,000 have been paid by 83 companies operating in 15 separate districts.

The world's biggest open-cut copper mine, the Utah Copper, and the Nation's largest silver mines are in Utah. Among the states it ranks first in silver production, fourth in copper production, and seventh in the production of gold.

MINERAL WEALTH PRODUCED, 1865 TO CLOSE OF 1922

Salt	$8,987,622
Cement	17,050,854
Clay Products	16,438,150
Zinc	18,814,452
Gold	104,213,935
Coal	223,352,652
Lead	229,049,639
Silver	341,052,727
Copper	457,933,446

Mineralized State

The industry furnishes 85 percent of the freight traffic originating in the state, and its mines, mill and smelters, furnish employment for 18,000 men, totaling a payroll of approximately $30,000,000 annually.

One-fifth of the state is underlaid by coal. The United States Geological Survey has estimated that, if all the coal in Utah could be loaded into cars, averaging 40 tons to the car, it would make a solid train that would girdle the earth at the equator 304 times.

The deposits in the Ruhr basin are of sufficient extent to employ constantly 500,000 miners and will produce coal for many generations to come. The Carbon county coal deposits are rated as the largest and best grade of bituminous coal in the country.

In addition to precious and semi-precious metal deposits there are vast stores of known iron and coal deposits, the world's largest alunite deposits which are rich in potash and aluminum, immeasurable tonnages of oil shales which government reports estimate contain more than 42,800,000,000 barrels of oil and 500,000,000 tons of ammonium sulphate.

Although ore production has been made continuously since the first discoveries, it is important to note that all of the first mining camps of the state are to this date important producers, and the lateral extent or depth of commercial ore deposition has not yet been determined in the main districts. In recent years new mines now producing at the rate of $1,000,000 annually have been opened in outlying areas.

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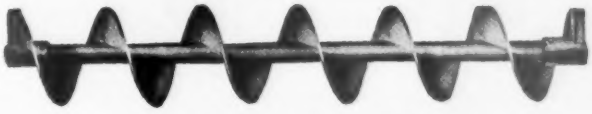

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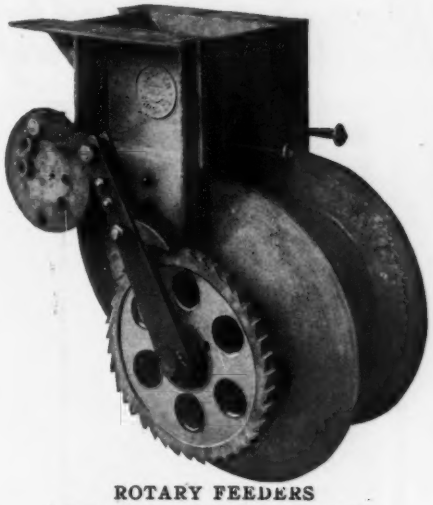

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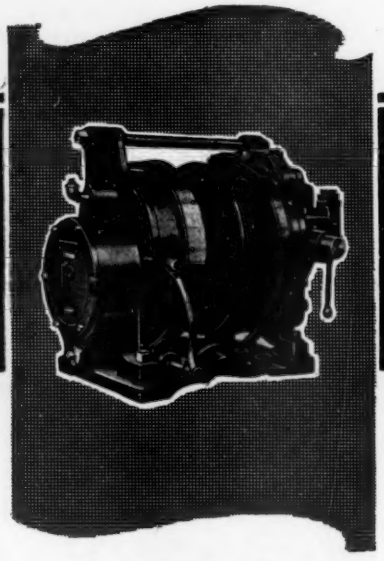

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The
MINING CONGRESS JOURNAL

PUBLISHED EACH MONTH BY
Subscription Rate: Per Year, $3.00

THE AMERICAN MINING CONGRESS

MUNSEY BLDG., WASHINGTON, D. C.
Single Copies: $0.30

VOLUME 12 | JANUARY, 1926 | NUMBER 1

THE REVENUE INVESTIGATION

ADDITIONAL volumes of secret testimony, attacking the Federal tax settlements of the mining and oil industries, have been released by the chairman of the Senate Committee on Investigation of the Bureau of Internal Revenue. This testimony shows that all sorts of charges were made against these industries and their representatives, as well as against the Treasury Department, by witnesses and agents whose right to qualify as experts and unbiased investigators may well be challenged. The testimony also shows that the mining and oil industries were not afforded any opportunity whatever to present the facts.

The American Mining Congress, in a resolution adopted unanimously at its recent Washington convention, condemns the procedure followed in conducting the revenue investigation, which has given the mining and oil industries no opportunity for full public hearing and discussion of the merits or demerits of the charges made against them. The resolution alleges that the method of conducting the investigation has seriously impeded the work of the Bureau of Internal Revenue, and has created conditions of uncertainty at a time when both the bureau and these industries needed a constructive solution of their problems instead of needless interference.

The resolution makes it very plain that the mining and oil industries would welcome a full public hearing on the methods and principles involved in the handling of their income and excess profits taxes. Mr. Paul Armitage, chairman of the American Mining Congress General Tax Committee, in opening the tax session of the recent convention, stated that the mining and oil industries are not afraid of attacks upon these issues. "They are prepared to defend their position, and to defend any taxes they have paid," Mr. Armitage said, "but they resent secret, insidious attacks where they have had no opportunity to present their side of the case, or to openly meet any charges made against them."

Solicitor of Internal Revenue A. W. Gregg asked, during the hearing, that judgment be withheld pending inquiry into all the facts. Inasmuch as the American public believes in fair play, the mining and oil industries can be assured that judgment will be withheld as requested by the bureau's able solicitor, Mr. Gregg. As evidence that the general public has not been convinced of the justification for the attacks against these industries, or of the accuracy of the one-sided testimony taken by the Senate committee, the editorial comment on the testimony has been generally favorable to the Treasury Department and Secretary Mellon, and against the conduct of the investigation. The Traffic World, foremost publication in the field of transportation, in its issue of December 19, makes the following comment:

"The oil industry * * * this week finds itself in the position of the bystander when a pistol duel is begun on the street. However, it is not like the bystander. It cannot run from this fight. The duelists are Senator Couzens, of Michigan, and Secretary Mellon. For two years they have been fighting, the former believed to be trying to show that, as a Secretary of the Treasury, Mr. Mellon is a fine steam-shovel operator. Mr. Mellon, in defense, has suggested that, as a citizen, Mr. Couzens is not much of a help to the community, else he would have more of his money invested in stocks and bonds of industrial enterprises and not nearly so much in tax-exempt bonds. * * *

"The (Senate) committee has taken about 4,500 pages of printed testimony, in secret, the fifteenth and sixteenth volumes of which Senator Couzens laid before the Senate a few days ago. * * * The next morning, some newspapers came out with articles containing the substance of charges made by lawyers and engineers employed by the committee. * * * The effect on the newspaper men who wrote the head lines, seemingly, was about the same as if the committee had made such charges, instead of merely that its employes had given testimony in which they expressed the opinion that the Internal Revenue Bureau should have collected more money than it did.

"The fact that the oil companies had not the slightest chance to be heard and the further fact that the bureau lawyers and engineers pointed out the highly controversial character of efforts to say how much an oil well was worth when it was found, were not brought out as prominently as the criticisms or charges made by men subject to Senator Couzens orders.

"Wherefore, the oil industry * * * wonders when business will have a chance, before legislative bodies, such as courts are bound to give litigants; and how soon the Senate will curb individual Senators who may be grinding personal axes at expense to the public and to itself."

Neither the mining and oil industries as a whole, nor the individual taxpayers whose tax cases have been made the basis for attacks, object to a public airing of the entire controversy, if all the facts are aired, instead of merely those which tend to support only one side of the issue. Manifestly, all the facts will not be disclosed unless these industries are permitted to have their day in court. The new revenue bill proposes to create a joint commission on taxation to investigate and report to Congress upon the Federal system of taxation. This proposal should be enacted into law, and the proposed report of the Senate committee, and all questions raised therein, should be referred to the commission, in order that taxpayers may be heard, and all the facts carefully reviewed before any action is taken by Congress.

THE NEW REVENUE BILL

THE prompt action of the House of Representatives in passing the proposed revenue act of 1926, is pleasing to the taxpaying public. Similar prompt action by the Senate is possible. The bill contains few new administrative features. Therefore, no new administrative complications of a serious nature will follow its enactment, such as have followed the enactment of previous revenue laws. And the Committee on Ways and Means very wisely made provision in the bill for a non-partisan commission to take up the study of existing administrative difficulties and complications for the purpose of securing their simplification and improvement. The findings and recommendations of this commission undoubtedly will result in intelligent and constructive administrative changes two years hence.

Further stabilization of business and increased prosperity through the expansion of industrial development may be expected as the result of the reduction of surtax rates. The existing high surtaxes unquestionably have caused much capital to be diverted to tax-exempt securities, and have lowered the amount of capital which normally should flow into or be available for industrial enterprises. Chairman Green indicated in his report that the members of the Ways and Means Committee, in drafting this bill were conscious of the necessity for preparing a permanent peace-time tax structure.

The increase in personal exemptions and the reduction in normal tax are the only changes that are of doubtful economic benefit. Individuals subject only to the normal rates provided under the act of 1924 can not logically be considered as overtaxed. The new bill will reduce the number of individuals subject to the Federal income tax, and there is considerable merit in the contention advanced by some that total exemption from Federal taxes will tend to lessen the interest of voters in their Government, and will destroy to a large extent the feeling of responsibility for that Government which exists as long as there is a liability for taxes for its maintenance. In other words, the voter who shares even an insignificant part of the cost of Government, will take a greater interest in how the revenues collected are expended, than the voter who contributes nothing.

But the Ways and Means Committee prepared a good bill, notwithstanding some details which may be open to criticism. The non-partisan spirit with which the public hearings were conducted, which governed the work of the committee in its executive sessions, and which was apparent while the bill was being considered in the House, evidences a desire on the part of the leaders of Congress to get away from political and partisan questions while dealing with the revenue structure which so vitally affects every phase of business and industry.

The new bill places the tax rate structure on a basis that undoubtedly is somewhere near permanent. It recognizes the fact that improvements are needed before the administrative provisions of the law can be considered permanent, and creates appropriate machinery, in the form of a commission, to take up the difficult task of working out a simpler and more equitable administrative system. In enacting previous laws Congress has had to consider a literal barrage of amendments, introduced both in the House and Senate, when there was insufficient time in which to investigate and determine which were practical and which were not; with the result that each new law has been more complicated and confusing from the administrative standpoint. Such a condition doubtless will be avoided in enacting the present bill.

The capital stock tax and a few other war-time taxes remain. They impose real hardship upon some small corporate taxpayers, particularly small mine development companies that are subject to the stamp tax at organization and the capital stock tax annually thereafter, although remaining in the development stage and earning no profit. But these taxes will be repealed eventually, probably two years from now. In the meantime, the Government's financial structure will be established on a permanent peace-time basis; foreign debt settlements will have been completed, and the existing uncertainties in the taxation revenue system will have been largely eliminated.

PROPER COMPENSATION

IN the early days of autumn an automobile tourist stopped at a gasoline station in Pennsylvania and fell into conversation with another tourist, who proved to be one of the striking anthracite miners. The first-mentioned tourist said:

"I can't quite get straight what it is that you are striking for. You seem to be well dressed. You have a good type of automobile, which is practically new. You have a wife and five children, who are all well clothed. And you seem to have money enough to allow you to indulge in some of the luxuries of life. What is it that you are so grieved about that you are willing to go on a strike?"

"It is true," replied the miner, "that we have all of the things you mentioned. But you have probably heard about the profits of the operators. In fact, as mere workers we are satisfied. But we think we ought to have a share in those profits."

Since that occurrence it has been proved by the actual figures that the locomotive engineers make, on an average, a little less than $2,000 a year, while the practical anthracite miner can easily earn $3,500 a year. The hazards of the two occupations are about equal. The locomotive engineers have not gone on a strike for years. The miners' union has been on strike 11 months out of the last 44. This serves to raise the question: What is fair compensation for the efforts of a worker? The anthracite miners say that they want a wage which tops that paid other skilled workers and then a percentage of the profits.

Governor Pinchot, of Pennsylvania, evidently agrees with them; he says that they should have it. That is, Governor Pinchot said that as a basis for arbitration it should be agreed first that wages should not decline within five years; the present wage is to be the minimum wage. He then stipulated that the selling prices to the public should not increase within five years. Thus he stipulates a minimum selling price and a minimum wage, both of which should be fixed by agreement. Then he proposed that if, between these narrow limits, any profits should accrue to the operators, those would be subject to levy if a board of arbitration should decide that the operators could, out of them, pay the men more.

It is difficult to refrain from the frankest expression of opinion about such a proposal. However, Governor Pinchot has heard from the country on that score and we will confine our discussion to the main point. The fact is that the labor cost is only one of many items of cost of production. To all of those other items somebody has contributed. Therefore somebody, other than the miners, has to be paid.

Of course, all of these costs must be met whether there

are any profits or not. The wages of the miners come in that category. For a year and a half the operators paid those wages and those other costs when they were enduring losses. When there is that security to the wage earner, he has no right to expect that he shall also share in the profits.

But even if, in a spirit of great liberality, the operators should consent to a profit-sharing plan, there are other considerations. The labor cost is only one of many costs. Those other costs have an equal claim upon any profits of the industry—if we adopt the theory that those who share in the costs should also share in the profits. Thus we would have as many divisions of the profits as there are items of cost. If we should follow that theory to its logical conclusion, the operators would be conducting the business for the benefit of those who sold it their labor, their machinery, and their supplies. They would have nothing left for themselves. This means that they would not be in the business. That, in turn, would mean that there would be no market for labor nor for anything else.

A mere statement of the possibilities makes it plain that this proposal fails to suggest a proper compensation for men for their effort. The miners are either working for wages or they are in business. They must be satisfied with mere wages or take their chances on profits. There is and can be no fair combination of the two.

NO DELUSIONS LEFT

A SERIES of events, coming to a climax in the anthracite strike, has left the coal industry with no delusions as to any phase of its problem. As a result, nothing is left to the industry but to effect a reorganization in keeping with its present knowledge and its freedom from false hopes.

So long as the industry did not know the truth it was justified in pursuing even mistaken beliefs. In any event, it cherished fond hopes of a turn toward profit on theories which are now exploded. To be specific, the industry knew, in a general way, that it was dealing with a crude natural resource which was so abundant that the selling price might always be expected to be low. Accepting that as inevitable, individuals have still hoped that they might find profit in "quantity production." They pursued that policy for years, only to learn that while a mine opened today might be bigger than any other mine, it became a second-rate mine the instant some one opened a larger mine. And a mine once opened could not be enlarged; its capacity was practically fixed during its lifetime. When a mine's life is easily a quarter of a century, and when each year brings the building of larger mines, reliance upon mere quantity production on that theory proved to be a delusion.

The industry has tried to control the product of the mines in about every way. It has tried to prevent, even, the shipment of unsold coal to market. Or, when allowing the shipment to proceed, it has tried to remove the effect by the storage of the surplus. It has now learned that any effort to control the product, without first controlling the plant which produced it, is futile. And it has found that the plants cannot be controlled, successfully, unless there is first control of the land into which the plants are sunk. Efforts in that direction have proved to be a delusion.

The coal industry has believed that if the operators should come to know how much it costs them to produce coal they would stop selling it at a loss. Therefore, the industry at times has taken up seriously the matter of an uniform cost accounting system. But the Fuel Administration, by seeking a basis for price fixing, and the Treasury Department, by seeking a basis for taxation, exacted the most accurate cost accounting. Every operator knows today what it costs him to do business. He must know. The law demands it. But the selling of coal below the cost of production goes on just the same. Efforts to control market tendencies by a system of operator education have proved to be a delusion.

Many of the operators have believed that if the truth about their industry were known the public would look with sympathy upon them and give them a profitable price. This theory has now been thoroughly exploded by the fact that the public has allowed millions of investment to be wiped out without offering to raise the price of coal a single penny per ton.

For years the industry has looked with envy upon the satisfactory market condition—as supposed—of the anthracite industry. The hope has been nursed that one field after another might thus segregate its own market and enjoy in it a secure position. But when the truth finally falls out, it is that 40 percent of the anthracite coal has been sold at a loss and the other 60 percent of the market will, if the price rises too high, be taken by other fuels.

All of these beliefs have been held by a considerable body of coal operators. A small number have, even, believed that the Government might be interested to the point of prescribing a minimum price for coal. These few have now learned that the governmental interest is confined to other phases of the question and that the thought of a minimum price has never entered the mind of a single member of Congress.

So long as these various delusions endured men were buoyed by them. Now that, one by one, they have been destroyed, the operators are taking a serious view of their situation. They must construct a new foundation upon which to stand. There is need for a reorganization; there is talk of it. If we were to suggest anything along that line it would be: The efforts heretofore have been to reorganize the industry and then conform the buying habits of the public thereto. The better plan would be to discover first the buying habits of the people and shape the organization of the industry to meet it.

NO POSSIBLE COMPROMISE

WITH the Congress in session, there is always a possibility that proposals will be made for the regulation in some form, of the coal industry. That raises the question: "Can anything be proposed which will meet the naturally divergent views of both the operators and the legislators?"

We are not prone to say, off hand, that such a thing is impossible. These are the days of inventions and discoveries. But it is extremely unlikely that there will be found any new device which will serve as a satisfactory compromise. And, we are quite positive that no device so far employed will meet the needs of the coal business.

That is to say, the operators are in the coal business for the sake of making money. What they are interested in is the return on their investment. They would like some form of loss insurance. That is, they would like a minimum price—preferably equal to their cost of production—below which neither they nor their competitors could cut. If the Government could arrange that, they would be deeply interested and highly appreciative. They would like also, some form of insurance against loss of business. If they close a contract this year, they would like to know that they could get

that same business a year hence. In addition, they would like assurance that when a buyer had contracted for a certain tonnage, he would take it when delivered. They might, even, like some assurance that the consumer would pay his bills when due. Those are the phases of the business in which the operators are interested. Anything the Congress could do along those lines would be highly appreciated.

What, on the contrary, the Congress wants is to get this question disposed of—to get coal out of politics. They want the people to stop talking about it; they wish the newspapers would stop writing at them about it. Their only way to do this is to shunt it out of Congress and into a bureau somewhere. The bureaus are interested in that sort of thing because it gives them more employes and more public money to spend. But all the bureau can possibly do is to gather figures about coal. The Government expresses itself in statistics.

The operators have so many figures now that they are nauseated with them. Besides, mere figures will not solve any one of the questions now bothering the operators. Figures record the result; they neither anticipate nor relieve it.

If the Government does not go into a statistical spasm, it tries for mediation and conciliation. But, it now has a bureau for exactly that purpose in the Department of Labor. It will serve no purpose therefore to create another. What that bureau says it wants now is facts—more statistics. And that is merely running around in a circle. Of late it has been proposed that, in the event of strikes, another temporary board should be provided. This is nothing more than turning loose upon a situation a committee of uninformed amateurs to supervise the work of the trained specialists. That gets nowhere.

The truth is that the operators want one thing and the Government wants another. The operators want to serve the commercial ends of their business. Frankly, the Government wants, merely, to add to its own political machine. When two such groups animated by such opposite purposes are discussing a problem, it is unreasonable to expect a compromise which will meet the views of both.

THE HOCH-SMITH LAW

THE Hoch-Smith Law, which provides for a general investigation of the railroad-rate structure of the country, is still on the statute books, but the problems created by it apparently are no nearer solution than they were when the law was passed. The Interstate Commerce Commission, whose duty it is to make the law effective, has been holding hearings, but no tangible results have been achieved.

The law is so broad in its scope and so vague in its terms that neither shippers nor carriers, nor even the Commission, have been able to agree among themselves or with each other as to what it means or what is to be accomplished under its provisions. The element of uncertainty that exists has kept the investigation from being of any practical value up to the present time.

Some shippers are presenting testimony and exhibits on conditions prevailing in their enterprises. Others have been reluctant to present their situations, and have been standing by, merely to observe the trend of the proceedings. The railroads, however, are taking care to see that the record is complete as to their interests. If the latter succeed in making a prima facie case of inadequacy of their earnings under existing rate levels, the Commission may grant a general increase.

A scientific study of the rate structure, which was said to be contemplated by the law, is not possible, since Congress did not provide funds for the necessary expert personnel to do the work. The Commission can not provide the necessary administrative machinery from its regular personnel or out of its regular appropriation. But even if ample funds and personnel were to be provided, the investigation seems doomed to failure because of constantly changing conditions.

Sentiment in favor of repeal of the Hoch-Smith law has not as yet moved members of Congress to act in that direction. The law will not be repealed unless that sentiment is brought to the attention of Congress in such a manner as to command notice. This is probably due to the fact that nothing has been done by the Commission which would enable shippers to determine with any degree of certainty how they will be affected.

The Hoch-Smith law has tended to cause suspicion and distrust, to break the ranks of the shippers, and at the same time to cement more closely the interests of the railroads. Shippers who are contending for rate reductions, know of course, that some group may have to bear rate increases in order that the rate structure will yield a fair revenue to the carriers. The whole situation is in a muddled state and repeal of the law seems to offer the best way out.

A VITAL WESTERN PROBLEM

IN AN ADDRESS before the Sacramento convention of the American Mining Congress, Mr. M. E. Dittmar called attention to the fact that an area of 23 square miles in California had produced copper in the form of blister for the transportation of which from the smelter to the refineries the railroads received $5,319,759. This return to the railroad was for the shipment in one form only of one product from this limited area. It takes no account of the many other classes of railroad earnings which resulted from the development of this small area, including coal and coke from distant points, some as far East as Pennsylvania, and the transportation of ores from distant points. It is safe to say that the earnings of the railroads, largely accruing to the Southern Pacific Railway, based on a prospective discovery, reach the total of more than $10,000,000.

Throughout the large territory of the land grant railways of the West, as a rule, every other section belongs to the railroad and the balance largely to the Federal government. Mining prospectors are practically prohibited from this area because the boundary lines between the government land and the railroad land cannot be distinguished and because the policy of the railroad company does not guarantee that a prospector may secure title to the land upon which his discovery is made. This enormous area is therefore practically withdrawn from the prospector searching for the precious metals.

In addition there are large areas included in the forest reserves in which, while the prospector is lawfully entitled to search for ore and secure title to his discovery, the conditions are made so difficult as to practically preclude the prospector from the forest reserves. In addition, very large areas are included in grazing lands entries which, while apparently open to the prospector, are made impossible by the requirement that he give a bond to cover any possible damage to the surface rights.

This important Western problem is in the hands of a committee of which Mr. M. E. Dittmar is chairman. The purpose of this committee is to secure such concessions as will open this immense area to the prospector. Communications from those interested in this matter will be gladly received by this office.

Reception of Delegates by President Coolidge

28th ANNUAL CONVENTION THE AMERICAN MINING CONGRESS

Convention Discusses Labor Situation, Anti-Trust Laws, Standardization, And Taxation—Leaders Assemble To Outline Policy Of Organization For Coming Year—Government Officials And Prominent Mining Men Address Meeting—President Of United States Sends Message

FOLLOWING the policy adopted at the 27th Annual Convention at Sacramento in 1924, the 28th Annual Convention—or Annual Policy Meeting—of the American Mining Congress convened at the New Willard Hotel, Washington, D. C., December 9. The policy adopted at Sacramento eliminated the procedure of the last twenty-six years, which has attempted to hold a joint convention of coal and metal operators at some central point. The organization during 1925 held a meeting of the Western Division at Phoenix, Ariz., and a meeting of its Coal Division at Cincinnati, Ohio. No attempt was made to secure a large attendance of mine operators at the Washington meeting. It was, in fact, a policy meeting, where the Board of Directors of the organization, together with the leaders in the industry from various sections of the country, came together for a discussion of the policies

Others of the Group Photographed at the White House

THE WHITE HOUSE
WASHINGTON

November 28, 1925.

My dear Mr. Cates:

I regret that plans previously made will not permit me the pleasure of attending the annual banquet of the American Mining Congress upon the occasion of its twenty-eighth annual convention in Washington next month.

In view of my inability to be present in person on this occasion, will you be good enough to extend to the assembled delegates my personal greetings and my hope that their united efforts may make of this convention an outstanding success, notable among the achievements which have marked the progress of your organization. It is only by such cooperative effort as your organization typifies, that the vast and intricate problems of modern industrial development can be successfully solved. In your hands lies the guardianship of the great mineral resources of the nation, and in a large measure, the responsibility for the efficient and economical conversion of this natural wealth into the innumerable finished products which so materially contribute to the wealth and prosperity of all the people. I am convinced that you are, individually and collectively, conscious of the duty which rests upon you to not only conserve these great natural resources of the nation, but to strive also to lessen the hazards to human life and safety in the recovery of the mineral wealth of the country for the use of its inhabitants and to seek still greater improvements in production methods and in the elimination of waste to the end that lowered costs may increase the wider use of the products manufactured from our basic mineral commodities.

It is through the earnest, united and unselfish labors of the men comprising such organizations as yours, that the eventual solution of the large economic problems of industry will be achieved and, so far as lies within its power, the executive arm of the Federal Government is ready and willing to lend its aid in this work.

Very truly yours,

Calvin Coolidge

Mr. L. S. Cates, President,
American Mining Congress,
Washington, D. C.

of the organization and to listen to the messages from the heads of various government agencies dealing with mining which center in Washington.

In the absence of L. S. Cates, president of the organization, who was unable to attend the meeting on account of the illness of Mrs. Cates, **Daniel B. Wentz** of the Stonega Coke and Coal Company, Philadelphia, and vice-president of the organization, presided at the opening session. Excerpts from President Cates' address appeared in the December issue of this journal.

General Mining Conditions

The first session of the convention was given over to a discussion of mining conditions generally throughout the United States. **Josiah Keely**, president of the Cabin Creek Consolidated Coal Company, Kayford, West Virginia, told the convention:

"It is not generally known throughout the country that up until very recently West Virginia, instead of being a typically non-union state was 80 percent organized. For ten years we went along with 80 percent organization, that condition culminating in the South with the Mingo march and in the North with the Jacksonville agreement. This year there will be one hundred million or more tons of coal put out in West Virginia, considerably less than five percent of which will be union coal.

"I am a little surprised at the appearance of press accounts speaking of 'too many miners' as synomous with too many mines. The expressions 'too many mines' and 'too many miners' are used synonymously, and the writers do not seem to realize that the 'too many miners' proposition really does enter into it. If they had a proper number of mines, unquestionably it would be a selective proposition and those that were unfit would drop off into other professions. A man's job would be worth something to him. It would have very materially to do with the labor situation.

"As a matter of fact, I do not know of any mine in West Virginia but what is under-manned right now. I think if you will go around over the country generally and ask whether they have enough miners they will all tell you they have not. It is just a question of too many mines. I do not think this question of too many miners ever ought to come into it.

"In the next three or four years some very interesting things are liable to happen to the coal industry—almost anything. A few combinations are starting in West Virginia, in the way of consolidations, but I do not believe any one is voluntarily going to throw up his interests and go into a consolidation. It is going to be a matter calling for extreme unction. The thing will go along until that is about the only thing a good many of them can do. Every strong organization is hoping to weather the thing out, until there are some combinations that will control the situation. All will stay out that can, and all will go in that must, and that is going to be a considerable number of them."

D. C. Kennedy, secretary of the Kanawha Coal Operators Association of West Virginia, said:

"The labor policy of West Virginia is charged with all sorts of possibilities. In the Kanawha district where at one time we were 100 percent organized we are now working 100 percent non-union.

"I believe that the union is doomed so far as the Kanawha district is concerned. They went along with it for quite a while, tried to play with them, to be fair with them, but on account of the arrogant tactics of the local officials down there, backed up by some of the national officials, it was deemed best for the district to go into a fight and clean them out. They did it, and the men are working and cooperating with the companies 100 percent. There are still a few camps scattered around the Kanawha district in which the United Mine Workers are paying the men to stay. But everything has been quiet and peaceful, and I think the miners who are working down there now with these coal companies are loyal. They have made more money in the last year working on this individual contract proposition than they ever made working under an agreement with the United Mine Workers."

Speaking for the western states and more particularly for the copper industry, **John M. Sully**, of the Chino Copper Company, said:

"There are not very many labor questions in the State of New Mexico. There are only a few mines, mostly coal mines. I happen to be connected with a coal mine, and also with a copper mine.

"New Mexico is a non-union state. At Globe there is a small local, with eight or ten members, but we never hear anything of them. We are strictly non-union in all operations, and we have had little or no trouble with our men since 1917. We have tried to be fair with them, tried to give them the best working conditions and the greatest number of working days.

"In the copper mines and metal mines we have a good many Mexican laborers, who are also skilled metal miners, and they are paid fair wages. New Mexico is rather quiet and free from any labor disturbance of any kind. The general depression in metal mining has been rather disastrous to New Mexico for the time being, but things are looking better and everything is steadying down.

A. G. Mackenzie, secretary of the Utah Chapter of the American Mining Congress, representing that state at the convention, said:

"There has never been a closed shop in any mine or mining plant in the state, or in this district. We have had unions, local unions, and still have, I think, in some of the camps, and Salt Lake City has shared with Butte, for many years past, the doubtful distinction of being one of the western headquarters of the I. W. W. The operation of that organization makes the Western Federation of Miners really respectable out in that country. I can illustrate that by saying a few years ago in one of the camps when a strike was proposed and in part initiated by the I. W. W., the members of the Western Federation got together one evening, without any assistance from the mining people, and chased a big bunch of 'wobblies' out of town.

"The state of the industry, in Utah, as a whole, is fair. We have a coal industry—not so extensive as in some of these eastern and middle western states—but it is considerable, and they are confronted with a condition which you might call economics of the coal industry. It is best described by saying that the production is being limited by the market. I think I can say that Utah coal mines could double their production, without spending an additional dollar for equipment. In other words, we can over-supply our present market one hundred percent. At the time of the great bituminous strike a few years ago, we had no trouble in Utah, and on that occasion we broke all coal production records of the state, and increased our normal output almost fifty percent, due to the widening of the market.

"We also have a young iron and steel industry in the state which has made a substantial start. They have been on a productive basis for a year and a half. Of course, the plant is small, compared with the tremendous institutions elsewhere in the country, but the promise is good. We have ore reserves, and sufficient coal to insure indefinite operations on a large scale. In this particular section of the country, the ore is about 200 miles away, and the coal 100 miles, and there is a fine grade of coking coal which they are operating in connection with a blast furnace.

"Of course, our big mining industry is in the non-ferrous metals—copper, lead, silver—and we are rapidly becoming more of a zinc producer. We have always had the zinc, but have not been able to treat it profitably. In consequence of some metallurgical development, however, we are accomplishing very substantial results, and whereas a few years ago an excess of zinc brought

the producer a penalty and smelter treatment, we are now saving that zinc and being paid for it, and that is an important feature. For instance, we are now mining and treating zinc ores that were formerly discarded, and we are now representing that as a liability rather than an asset, and we are also reworking old dumps and tables, some of which have been idle for generations. This has been from a metallurgical standpoint a very important discovery and from an economic viewpoint one of the most interesting developments of the last few years.

"Our lead producers have had a very fortunate year and we have now a substantial lead production.

"The silver market which is important to us has been fair and because of the fact that our silver occurs largely in the production of lead, the present silver market has enabled our silver and lead mines to get by in good shape.

"Copper has been perhaps a little better than for the last year or two, but it is not yet what we think it should be. We have three or four copper producers, and two of them operate under peculiar conditions, and there is the world famous Utah copper mine which operates on an extensive scale, and therefore they can probably make economies that smaller plants can not. They have been operating practically throughout the year.

"Another interesting operation is our mining which is operated without miners. It is a rather interesting operation called leaching, a more or less simple process by which they introduce water and let it percolate down through and then recover the copper below. It produces a very high grade concentrate in mines that have not been operated on a successful financial scale before. By the introduction of this method mines have paid dividends, which will doubtless be continuous.

"Generally speaking the Utah nonferrous ores are what might be called low grade. In consequence of that the history of the most successful commerce in the state has been that successful operation has followed the consolidation of smaller properties that were either failures or only moderately successful as individual property. Perhaps ninety-five percent of our total production comes from a dozen companies."

A. P. Cameron, operating vice-president of the Westmoreland Coal Company, discussed the coal situation in Western Pennsylvania, saying:

"The situation in Western Pennsylvania, as far as it pertains to our coal company at this time, is easy to explain, but to endeavor to portray the mining situation in Pennsylvania would require volumes. It is not necessary, however, for any one individual to speak on the situation in Pennsylvania, because the daily papers, the mining papers, in fact all of the papers that are being printed, almost, have some solution of the problem as it exists in Pennsylvania.

"We have one mine in our district that is producing quite a large tonnage—2,500 to 3,300 tons a day—that has always been operated as a non-union operation.

"We have not had any controversy with the United Mine Workers since 1910. We have had two strikes in thirty years. In 1890 we were besieged by the United Mine Workers and they kept us busy for quite a while—I think it was five or six months—but we finally succeeded in getting our labor to view the situation from our point of view, and we were not disturbed again until 1910. The same thing happened then. We were besieged at that time by outside influences, but we fought and we won. We had no trouble until 1922. In 1922 we were attacked again, but we were not shut down by any means. We never shut down. I do not consider we are shut down unless we do not produce coal. We have always produced coal during all of the attacks of the United Mine Workers.

"I could not give you any rule by which you should run your operations, but so far as the Westmoreland Coal Company is concerned, we keep in touch with our men. We try to make our men believe we are the best company in the United States. Many of our men have been with us a good many years, and if there is any situation which arises where there is a controversy between the men and the company, so far as wages are concerned, we meet them and talk the matter over with them."

J. D. Conover, official representative of the Tri-State district, speaking in behalf of that district, said:

"The Tri-State district includes the old Joplin field of the southwest in Missouri, Oklahoma, and the new mining district of Southern Kansas, about sixty percent of the production coming from Oklahoma, and a large portion of it from restricted Indian lands. This district which produces approximately two-thirds of the zinc in the United States is at the present time quite prosperous. There are, I believe, 169 mills operating at the present time. The average capacity of a mill is about 250 tons per ten-hour shift. That is the largest number of mills and the highest production that has ever been reached in the Joplin district. The production at the present time runs about 17,000 tons of zinc concentrate and 10,000 tons of lead concentrate per week. Practically all of the production is sold at the mine bins to the smelters. There is very little surplus on hand at the present time and the general prospect is good. There is more activity going on than has been going on for a long while. There are some 500 drill rigs prospecting for new ore bodies, and a person can count some 15 to 18 new mills which are being constructed or which will be constructed in the near future.

"There are some 8,000 to 8,500 men working in the mines in the district, and over 99 percent of them are white and native born. They have never been unionized and all attempts to unize them have fallen flat. The last attempt was made last summer, when some of the organizers from farther west came into the district, and a considerable number of unions were organized, associated with the United Mine and Smelter Workers of America, and after about three or four months the men quit paying dues and the locals were discontinued.

"The relations between the workers and the operators have been very good. There has been sort of a tradition that the miner today was the mine operator tomorrow, and as the district is one of small operations and small mines, that has been literally the case, and the miners and the operators are together. There is not now and there has never been trouble between them. Wages are based on the prevailing prices of zinc concentrates 'jack.' With every $5.00 increase in the price of jack, there is a 25-cent increase throughout the mine, and when the price recedes the 25 cents is taken off and there is never any question about it.

"We are interested in the questions which will be discussed at this conference. There is one specific question in which we are very vitally interested, and that is the discovery and depletion clause of the present income tax law, and the maintenance of that clause, with at least such benefits as it still affords the metal mining industry. Our district is one of short-lived mines. The average life of a mine is four or five years, and every company which intends to keep on mining must be constantly prospecting and looking for new mines. Many of the profits which had been made are lost when the company begins to look for new ore beds, and we feel it is highly important that some relief from taxation be afforded and that the operators be allowed to maintain a reasonable proportion of the profits that they make."

Labor Problems

One of the most important sessions of the entire convention was that of Thursday morning, December 10, which was devoted to labor problems. The speakers before this session were the **Hon. James J. Davis**, Secretary of Labor; **Sidney J. Jennings**, United States Smelting and Refining Company; **Samuel**

Robert E. Tally, General Manager, United Verde Copper Company, elected Third Vice-President, The American Mining Congress

George B. Harrington, President, Chicago, Wilmington and Franklin Coal Company, elected to the Board of Directors, The American Mining Congress

D. Warriner, Lehigh Coal and Navigation Company; and the Hon. James Murdock, former Minister of Labor for the Dominion of Canada. These addresses will appear in full in later issues of the Journal.

Taxation

Attacks upon the mining industry in connection with tax settlements made by the Bureau of Internal Revenue were discussed at the tax session. While the convention was in session, additional testimony taken during the hearings before the Senate Committee on Investigation of the Bureau of Internal Revenue was being released to the press. Much of this testimony, as in the case of the testimony released several months ago, dealt with matters affecting the mining industry.

Referring to this situation, Paul Armitage, chairman of the General Tax Committee of the American Mining Congress, in his opening statement to the meeting, said:

"It seems to be the favorite sport nowadays to attack the mining industry and particularly the handling of its income and excess profits taxes. The mining industry is not afraid of being attacked upon these issues. It is prepared to defend its position and to defend any taxes which it has paid; but it does resent secret, insidious attacks where it has no opportunity to present its side of the case, or to openly meet any charges made against it. That is what is happening here in Washington."

Mr. Armitage said that the attacks against the industry have taken two forms. One has been the charges that have been made in secret against the industry in connection with which the Senate Investigating Committee has taken reams of testimony. He said that neither the mining industry nor the taxpayers who were attacked were afforded any opportunity to defend themselves. He said that the other form of attack has been an attempt in the Treasury Department to reopen, after several years, cases that were once closed in order that arbitrary revaluations could be made and additional taxes assessed for past years. He stated that if those attacking the industry could have their way the mines of the country would get nothing at all under the depletion section of the law. As the result of the deliberations on this subject, a resolution was adopted which will be found elsewhere in this number.

The main speaker at the tax session was the Hon. Joe J. Manlove, United States Congressman from the Joplin district.

Mr. Manlove declared that the corridors of history are strewn with wrecks of governments which fell into decay because of unequal and oppressive taxation. "So long as the business of the country is at high tide, incomes will be greater in number and larger in volume than during times of depression," he said.

He discussed the discovery and depletion allowances to the mining industry under the revenue law and commended the statements of zinc and lead producers of Missouri, Oklahoma and Kansas, to the House Committee on Ways and Means in behalf of continuing these allowances. "There must be a continuous discovery of new zinc and lead ore bodies to take the place of the short lived mines which are exhausted," continued Mr. Manlove. "It is highly proper that concessions should be made to those willing to take the hazard of the uncertain undertaking. Not only do these provisions enure to the benefit of the mine operator, but they preserve to the public the advantage of having the benefit of these metals within the bounds of a reasonable price."

Mr. Manlove urged the mining men to consider the severance taxes which are established in Minnesota and which have been proposed in Missouri. He described these proposals as attempts "to fasten upon the products of mines a tax upon gross production."

Discussing the disadvantages to which mining men are placed by reason of numerous tax administrative details, he stated: "The busy mine operator can not devote much of his time to problems of taxation." For that reason it is necessary that the mining industry should have a continuing organization such as the American Mining Congress with its experts to provide information and statistics and otherwise represent its interests at the seat of government.

He said the tax studies of the American Mining Congress had been instrumental in the creation by Congress of the Board of Tax Appeals and the proposed reorganization of the Revenue Bureau by the new tax law which establishes a general counsel and several deputy commissioners in the Internal Revenue Bureau.

He commended the Mining Congress for its constructive recommendations which have simplified the law in its application to the mining industry. "The information of the tax division of your organization is always available to Congress and the government departments when questions of fact or policy arise affecting the mining industry, and this has been of great value to all interested in taxation," he said.

Mr. Manlove indicated his opposition to the capital stock tax on the ground that a struggling mine development company should not pay a tax cumulative year by year on a natural resource which should be conserved in keeping with the demand.

He approved the decentralization plan of the Revenue Bureau to relieve the heavy expense incident to the settlement of tax disputes in Washington. He said it should be the policy of the government that in separating a man from his money the operation should be made as painless as possible.

Referring to the effect of taxation on the prosperity of the country Mr. Manlove said that so long as the mines and factories are busy and the wage earners are receiving a good wage, agriculture must eventually find a fair market for the fruits of its labor and that a general healthy business conditions will exist. "Business is so inter-woven that each one of the myriad wheels working within the whole cycle is, more or less, dependent upon the other," he said. "Overburdensome, excessive, or duplicated taxation might break some of the cogs in the wheel of prosperity."

Discussing overproduction, he said the Anti-Trust law would forbid producers to combine to restrict output, although such excess production overloads smelters and operators do not desire to mine and deplete their ore bodies without a profit. Operators realize that the natural resources must be conserved.

In conclusion he stated that unaided, the zinc mines of the country could not operate, as Mexican ore would close every mine in America in the absence of a tariff duty. He also referred to assistance rendered to zinc mining by the Department of Commerce.

Standardization

The Sixth National Standardization Conference was held on Thursday afternoon, December 10. **Col. Warren R. Roberts**, chairman of the Coal Mining Branch of the Standardization Division of the American Mining Congress, was presiding officer. Reports were presented by Colonel Roberts on the progress made during the last year in regard to standardization work, and **W. A. Rowe** of the American Blower Company presented a progress report from **Chas. A. Mitke**, chairman of the Metal Mining Branch of the Standardization Division. These two reports show that while some of the committees have progressed steadily the major bulk of the work is awaiting the action of the Mining Standardization Correlating Committee and the American Engineering Standards Committee upon reports that are now before these bodies for adoption as tentative American standards.

The reports now before the American Engineering Standards Committee for the Coal Mining Branch include Underground Transportation, Mine Drainage, Mine Ventilation, Outside Coal Handling Equipment, Underground Power Transmission and Power Equipment.

For the Metal Mining Branch the following reports are before this Committee: Underground Transportation, Fire Fighting Equipment, Mine Ventilation, Mechanical Loading Underground, and Methods of Mine Sampling.

The majority of these reports have been before the American Engineering Standards Committee for the past three years. The only report that has been expedited to any point where definite consideration may be given is that on Coal Mine Ventilation, upon which the American Engineering Standards Committee has ordered letter ballot for final vote for approval as a tentative American standard.

Ray M. Hudson, Chief of the Division of Simplified Practice, United States Department of Commerce, told this session of the convention that:

"Simplification is a process which can be applied to methods of production. Our particular division in the Department of Commerce has been concerned mostly with the reduction of variety in commonly used commodities. I think many of you know the story of the simplification of paving bricks, from sixty-six to four sizes, and in forged tools from some six hundred and sixty odd varieties to about half that number of sizes, types and styles. In the grinding wheel industry it was found that there were some seven hundred and twelve thousand different types, styles and sizes of grinding wheels, and the manufacturers found that variety a tremendous burden to maintain. They said that often times when they received orders for some of their goods they had plenty of the things that the customer did not want and were short of things he did want. There was a large percentage of stocks which was not turning over, nor moving out to the trade, and they came to the conclusion that perhaps it would be better for them to concentrate their selling efforts on the varieties which moved most rapidly.

"So through the cooperation of several different groups — machine tool builders, grinding wheel manufacturers and several other organizations representing the consumers of those products and our division, they succeeded in cutting that variety from some seven hundred and twelve thousand down to two hundred and fifty-nine.

"There is one lesson in that experience, and that is the cooperation, the team work which is necessary between all parties concerned with standardization and simplification activities.

"We have found that unless you can make fairly representative the original meetings or conferences at which these programs are mapped out, or the later general conferences at which these programs are finally adopted—unless you can make them fairly representative and a true cross section of the industries concerned, not alone the producers but the distributors of the commodity as well as the consumers, we do not get the results. There is a fear or a hesitancy on the part of those who have not been invited or who have not participated in the development of the recommendation that, perhaps, the other group is trying to legislate for them. They do not get that sense of mutual responsibility, or mutual interest, and consequently the standard or the simplified practice recommendation does not work out so well.

"So I think that in the development of all such activities as those in which this division of the American Mining Congress is engaged and the lines along which our division is working it is fundamental that efforts be made to get in all the interested elements, keep them thoroughly informed or well sold on the general program, make them feel their responsibility from the start and maintain their interest through to the end.

"We are trying to maintain a follow-up on the application and use of standards. We believe that it is not sufficient in the interest of the industry with which we are cooperating to just simply say, 'well, that is a fine job, fellows,'

when you have gotten your standards done, and that is all there is to it. We think that we must go further in their behalf, and give all the support and moral weight that we can to the group interested in the use of that standard, to the end that the greatest number of people concerned will use them. That, in other words, is the promotion end of the standardization work as distinguished from the producing end.

"I can appreciate how reams of paper, hours of draftsmen's time, a great deal of stenographic effort, and so on, can be wasted in the preparation of standards which merely become a page in a handbook. Unless those standards can be reduced to practice it is doubtful whether the effort to produce them is fully warranted. In other words, there is an obligation which rests on the standards producing units to see that the standards are applied, that the results planned for them, are obtainable, and the benefits which are anticipated are actually realized. Until any standards making group does that part of the work as well as getting out its standards, don't think it has finished its job.

"As I know the Mining Congress and its organization and the work it is doing, I can see quite an analogy between its interest in standardization and that of the government itself. The mining industry represents a large body of consumers of finished products, and so does the government by its various departments. And just as the government had found it desirable to develop standard specifications and standards of various sorts applying to its requirements, I can see where the potentialities in work which you are doing in behalf of your industry are tremendous.

"The biggest thing in the whole movement, as I see it, is that close correlation or coordination of effort and mutual interest in each others work, and that friendly spirit of cooperation which extends all over the field. As one group brings out a constructive piece of work we have found it often times ties in with what another group is doing. Sometimes you can bring them together, and when you do that they each gain something, and that very contact may again be the inspiration for further extension or development of the work. So it all has an interrelation which has a great deal to do with further extension. And while I know right well that it probably will never happen that standardization will be carried to such absurd extremes as to have us all living in the same kind of house and wearing the same kind of clothes, as some people fear, I am satisfied that the further we go in standardization of a practical sort and applying it in places where it means real savings and benefit we will just that much reduce the present degree of waste in all the industries."

Mining Industry and Trust Laws

The Fourth General Session of the convention was devoted to the mining industry and Anti-Trust Laws.

The feature addresses of this discussion were those of the **Hon. William E. Humphrey**, Commissioner, Federal Trade Commission, on "Changing Economic Conditions and the Anti-Trust Laws," and "Natural Resources—A Natural Exemption from the Anti-Trust Laws" by **Gilbert H. Montague** of New York City. Both of these addresses appear in full in this issue.

Hoover Message

Herbert C. Hoover, Secretary of Commerce, was the principal speaker at the annual banquet on Wednesday evening, December 9. The **Hon. Chas. S. Thomas**, former United States Senator from Colorado, was toastmaster. Mr. Hoover's remarks centered around the recent transfer of the United States Bureau of Mines from the Department of the Interior to the Department of Commerce. In part he said:

"My official job is to cooperate with the industry in those things that make for its welfare. The organic act of the Department of Commerce provides specifically that I shall 'promote and foster the mining industry.' Now I understand the meaning of the first word, 'promote,' but I have always been a little disturbed by the second word. I do not quite know what it is to foster an industry. It smacks of left-handed paternal interest. And I have noticed that when anybody starts out from Washington to 'foster' an industry he creates a good deal of resentment. I assume that the word was probably one of the fashionable phrases around Washington which were used to fill in conversation and public addresses, and that it probably belonged to the period. The word we use now is to 'cooperate,' and we might as well interpret it in that direction.

"You are all aware that the Bureau of Mines was recently transferred by an Executive Order from the Department of the Interior to the Department of Commerce. And some question has been raised in some parts of the profession and in the industry as to what the object of all that might be. The probabilities are that the country is fairly unfamiliar with the make-up of our official organism down here and did not realize that the economic relationships of the Government with the mining industry rested in the Department of Commerce. We believed that a greater service could be done to the industry if we brought our economic relationships under the same heading as our scientific relationships. We thought that if we could transfer the various economic phases of government work in relation to the industry to the Bureau of Mines, and create for it a dual capacity—that is, to serve the industry in the economic field as well as in the research and scientific field—we would improve our Government service in the interest of the industry by giving to the economic agencies of the Government the great advantage of intimate expert advice.

"We had some subsidiary objects. One of them was to secure a better correlation of our activities in our detailed administrative work. You will perhaps realize that four or five bureaus in the Department of Commerce were actively engaged in matters in which the mining industry is concerned. The investigation work carried on at the greatest physics laboratory in the world, that is the Bureau of Standards; the statistical work of the Bureau of Census; the economic studies of distribution in the Domestic Commerce division; the foreign trade promotion work in the Bureau of Foreign and Domestic Commerce; and the work of the mineral resources division of the Geological Survey—these services all appeared to us to be of economic character, and we felt that they should all be pulled together in a new division of the Bureau of Mines.

"Now in order that we should make no mistake, and that our action should meet the approval of the industry, I assembled a committee representing the different large associations concerned with mining, including the president of your own association, and delegated to that committee the job of saying what should be done with the Bureau of Mines to make it of more service to the mining industry. The members of that committee agreed with us fully as to the desirability of establishing an economic division, and that division will be established on the 15th of this month.

"We have hoped that by bringing all of these forces together we should have an agency in the Government that could be of assistance to Congress in matters of legislation, for legislation is not alone a technical problem, but it is always an economic problem.

"The Bureau of Mines has had a long and an honorable career of service. It has had a remarkable body of men. More especially does one look upon them with increased respect when you realize the pay given for such service. It is always a matter of amazement to me that the Government is able to secure men of such devotion and ability for positions in the administration at the remuneration that we give, and you will all agree with me that we have had few men in the profession that have been a higher type than those who have made such large sacrifice as that entailed in

the positions of directors and heads in the divisions of that bureau.

"We all of us regret intensely to have lost Dr. Bain, but I believe that in the choice of the committee, Mr. Turner, you will find an able director. He, in turn, is giving up a position of some five times the salary in order that he might do a period of service for his Government.

"Now, as I have promised you, I do not propose to make a speech. I could talk at great length perhaps on questions of regulation, but I have never been hopeful of catching an economic force with a policeman, and your industry is older than the tablets which were handed down from the Mount, and therefore no patent addition to the Ten Commandments is likely to perfect the development of the industry. You have gone on for two or three thousand years providing the world with such minerals as it needed from time to time. You have gotten along fairly well without Government interference and legislation.

"What I see that the industry needs is more information. More information of the type on the scientific side that the industry in its individual sense can not afford to undertake. More information on the economic side that can be collected only at the hands of some central authority such as the Government. And in the direction of a continuous outflow of helpful technical and economic information the Government can be of service. The Government can not be of any remarkable service in any other directions unless it be some extensions of the Ten Commandments as a basis of business ethics.

"The antiquity of this industry is perhaps more vivid in my mind than with some of you, because some years when the world was entirely at peace and none of us had thought of dealing with the cussedness of animate things I and my good wife undertook the translation of the first work on mining, written almost 400 years ago. I was reminded this evening of the last paragraph in the last chapter of that book as bearing upon this industry. Bear in mind that Georgius Agricola 400 years ago wrote this particular thing, which I believe is a fitting closing for this meeting. He said that—

" 'Inasmuch as the chief callings are those of the moneylender, the soldier, the merchant, the farmer, and the miner, I say, inasmuch as usury is odious, while the spoil cruelly captured from the possessions of the people innocent of wrong is wicked in the sight of God and man, and inasmuch as the calling of the miner excels in honor and dignity that of the merchant trading for lucre, while it is not less noble though far more profitable than agriculture, who can fail to realize that mining is a calling of peculiar dignity?' "

United States Senator Oddie, from Nevada, was also a speaker and pledged his earnest support of all mining bills which came before him as chairman of the Senate Committee on Mines and Mining. He promised a closer cooperation than has ever existed before between the legislative branch of the Government and the executive branch of the Government in mining matters.

In introducing Mr. Hoover, Senator Thomas said:

"Some time ago a gentleman said to me, 'Hoover's theories are all right, but why don't he put them in practice? Is he sincere? It seems to me that he is a radical in many ways.' My reply was that the sincere radical was seldom intelligent, and the intelligent radical was seldom sincere. But that neither of these vices could be laid to the door of the Secretary of Commerce. And so far as his occupying a double position is concerned, I reminded him that no man with a double chin has ever yet led a double life.

"Another reason why the Secretary has not accomplished as much as he can is that some 2,200 different civic and industrial societies, to say nothing of an additional million of Kiwanis and Rotarian Clubs, are constantly demanding his presence and his addresses. That, coupled with the favorite recreation of the Senator and Congressman who spends half of his time to secure the appointment of an additional stenographer, makes it necessary for the Secretary to do his actual Cabinet work at night. Consequently the progress which he has made is really remarkable."

A large number of the delegates to the convention were received by President Coolidge at the White House on Thursday noon, the convention closing Friday noon, with the following resolutions adopted:

RESOLUTION No. 1

Introduced by Sidney J. Jennings

WHEREAS, The President of the United States in his message to the Congress has specifically endorsed the settlement of industrial controversies by impartial arbitration, and

WHEREAS, In order to terminate the present intolerable situation in the anthracite region, the operators have offered to submit all matters in controversy, without reservation, to arbitration, therefore,

Be It Resolved, That the American Mining Congress places itself on record in support of the President's suggestions and endorses the principle of settlement of industrial controversies by arbitration.

RESOLUTION No. 2

Introduced by Chas. S. Hurter

WHEREAS, the mining industry of the United States is of vital importance to the prosperity and welfare of the country and,

WHEREAS, a unified control of allied interests under a common head tends to promote the best economy and efficiency.

Resolved, That the American Mining Congress most heartily endorses and approves President Coolidge's action in transferring the Bureau of Mines from the Dept. of the Interior to the Dept. of Commerce and heartily commends Secretary Hoover for his selection of the high type of men chosen to administer the work of the Bureau.

RESOLUTION No. 3

Introduced by Ernest M. Merrill

WHEREAS, The American Mining Congress holds that safety is a consideration of primary importance in mining, and

WHEREAS, One of the chief functions of the U. S. Bureau of Mines is to promote safety in the mining industry, and

WHEREAS, The purposes of the National Safety Competition now being conducted under the auspices of the U. S. Bureau of Mines, are to create a more lively interest in safety among all mine workers and to secure more complete statistical information on the causes of accidents and the means of preventing them, than has heretofore been available.

Therefore, Be It Resolved, That the American Mining Congress gives its endorsement to the National Safety Competition and recommends to all of its members that they participate in this worthy movement by supplying the prescribed reports to the U. S. Bureau of mines.

RESOLUTION No. 4

Introduced by The Western Division of the American Mining Congress

Resolved, That the American Mining Congress approves and recommends the efforts heretofore made and proposed to be made to require additional purchases of domestic silver in accordance with the true intent and meaning of the Pittman Silver Act of 1918.

RESOLUTION No. 5

Introduced by The Western Division of the American Mining Congress

Resolved, That we urge upon the national government such amelioration of the restrictions upon prospecting within grazing and agricultural lands and within national forests of the western states as will make possible the proper development of minerals therein contained and give prospectors assurance that their just rights will be protected.

RESOLUTION No. 6

Introduced by Tax Division of the American Mining Congress

WHEREAS, The mining industry is being subjected to (*Continued on page* 13)

THE STABILIZATION OF THE MINING INDUSTRY

Collective Curtailment Of Production And Cooperative Marketing, While Illegal, Is Most Natural Remedy—Stabilization Requires Either Removal Of These Restrictions Or Recognition by Producers Of Folly Of Overproduction And Results Of Unsystematic Marketing

By ROBT. E. TALLY *

THE stabilization of an industry requires the adjustment of the difficulties of that industry to the extent of making it more permanently attractive from the standpoint of investment.

The major difficulties of the mining industry, with but few exceptions, are over-production, unsystematic marketing, and high costs. The first two of these are responsible for low metal prices, and these combined with high costs make the margin of profit, if any, unattractive. The adjustment of productions to consumption, the orderly marketing of metals, and cost reductions are essential to stabilization.

Collective curtailment is the natural and most positive remedy for overproduction, while cooperative marketing would largely eliminate the selling difficulties. These methods, however, are illegal and cannot be used. The stabilization of the industry therefore requires either the removal of these Governmental restrictions or other methods of procedure.

Some effort has been made toward the removal of these restrictions, but the results to date are not encouraging. It is thought that any relaxation on the part of the Federal Trade Commission might result in Governmental regulations unacceptable to the industry.

The mining industry must therefore work out its own salvation. The producers should be shown the folly of overproduction and the results of unsystematic marketing. Production and consumption statistics should be published, the former by districts, and these figures should be cumulative.

There might be some criticism of this plan by reason of its giving the consumer too much information. However, the consumer automatically learns the situation from the sales policies of the producers, and at just about as early a date as the data is published. In any event the advantages of publicity overbalance any slight advantage to the consumer, and it is about the only method that will prove beneficial at this time. If all producers are informed of production and consumption figures, they have but themselves to blame if they do not individually curtail when necessary.

No association or Government can help an industry until the industry first tries to help itself, and the adjustment of supply to demand is the very foundation of stabilization.

Approximately twenty-five percent of the domestic copper production, and a considerable amount of the country's production of other metals, is sold by dealers not necessarily interested in maintaining fair prices, their sales being made on a commission basis. This method, which is detrimental to the interests of the producers, is of the most benefit to the dealer and to the foreign consumer.

Cooperative marketing is not permissible for domestic sales, but if properly organized could be used to good advantage for export sales. Therefore, the best way to improve marketing conditions is through a cooperative marketing association for the sale of export copper, and for the producers to sell their domestic production either individually or through agents financially interested in the price of the metal.

With the exception of taxation and freight rates, the question of high costs is a matter for the individual producers to work out. Mines have their individual problems, which they themselves must solve, but the proper solution of the taxation and freight rate problems requires the concerted efforts of the industry.

RESOLUTIONS ADOPTED

(*Continued from page* 12)

unjust public attack and suspicion consequent upon secret proceedings before the State Committee on Investigation of the Bureau of Internal Revenue, at which proceedings the Industry was not represented nor afforded any opportunity to present the facts, and

WHEREAS, It has been publicly announced in articles signed by the Chairman of the Committee that recommendations are to be made for changes or modifications in the provisions of the law with reference to Federal taxation of mines, without due and proper public discussion or hearing of the mining industry on the merits or demerits of the proposed changes, and

WHEREAS, The acts hereinbefore recited have been harmful to the mining industry, have impeded and interrupted the work of the Bureau of Internal Revenue and have created conditions of uncertainty in the relations between them at a time when the industry was depressed and the Bureau heavily burdened, so that both needed a constructive solution of their problems instead of needless interference, therefore be it

Resolved, That the American Mining Congress hereby protests against the injury inflicted upon the mining industry through such procedure, which is so contrary to the principles of justice and in such flagrant violation of the proper conduct of public affairs, and be it further

Resolved, That we endorse the plan in the proposed Revenue Act of 1926, recently introduced in Congress by the Ways and Means Committee of the House of Representatives, to create a joint commission on taxation, on which both Houses of Congress and the public shall have equal representation and which will by open and orderly procedure investigate and report to Congress upon the Federal system of taxation with the purpose to simplify and improve it, and be it further

Resolved, That we recommend the non-partisan and fair manner in which the Ways and Means Committee approached, considered and drafted the pending revenue measure.

RESOLUTION NO. 7

Introduced by The Resolutions Committee of the American Mining Congress

Be It Resolved, That the American Mining Congress expresses its thanks to the Hon. Calvin Coolidge, President of the United States, for his gracious reception of the delegates of the 28th Annual Convention on December 10; to the Hon. Herbert Hoover, Secretary of Commerce; to the Hon. James J. Davis, Secretary of Labor; to the Hon. Wm. E. Humphrey, of the Federal Trade Commission; to the Hon. James Murdock, former Minister of Labor of Canada, for their presence and participation in the proceedings of the Convention; to the officers, directors, divisions and committees of the Congress for their valuable services in the past year, which are commended and approved; to the speakers who have addressed the Convention and to all others who contributed to the success of this gathering.

*General Manager, United Verde Copper Co.

Paper presented to 28th Annual Convention of American Mining Congress.

CHANGING ECONOMIC CONDITIONS AND ANTI-TRUST LAWS

New Rule Of Stipulation Results In Greater Efficiency In Handling Cases And More Justice In Procedure—Cases Handled Seven Times As Rapidly And With Much Greater Economy—New Policy Of Trade Commission Explained

By HONORABLE WILLIAM E. HUMPHREY*

THERE have been important changes made in our rules and policies since I became a member of the Federal Trade Commission a few months ago. I shall only call your attention to two, as they are, in my judgment, the vital ones.

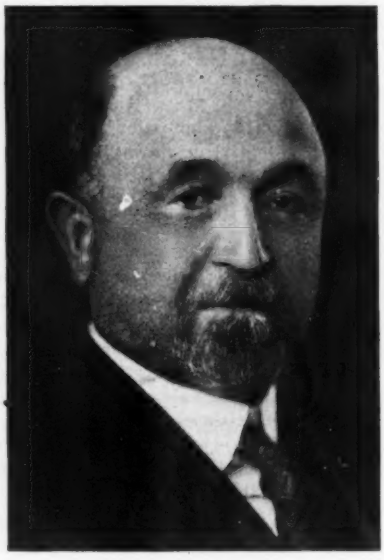
I was in Congress when the Federal Trade Commission act was passed and voted for it. I had a very distinct impression then, as I have today, that President Coolidge correctly stated the object of the creation of the Federal Trade Commission in his message the other day when he said it was to assist honest business. That is my idea of its purpose. The changes that have been made since I have been a member of the Commission—and they are revolutionary—are based upon this fundamental idea, that the majority of the Federal Trade Commission as it is composed today believe that the men and women engaged in business in this country are generally honest. We believe that they are trying to obey the law.

When I became a member of the Commission it was the practice when a complaint was made against some party engaged in interstate commerce—when an application was filed, as we say—that we sent out our investigators to investigate as to the facts. Sometimes those investigations were very complete and thorough, sometimes they were superficial, but generally they were only nominal, and they were always ex parte; that is, the accused party, called the respondent, had no opportunity to be heard.

Upon that investigation we issued a complaint. That complaint was made public, and at the same time that the complaint was issued we gave out a statement to the press as to the supposed facts in the case. That statement, coming out with an official stamp, naturally was given some weight. If the respondent was prominent, or if the political effect of the suit might be great, or if the allegations in the complaint were sensational it was given wide publicity and often glaring headlines.

It frequently happened that the respondent knew nothing whatever of the matter until he saw himself advertised in the press as a violator of his country's laws, and it sometime happened that months afterward, sometime years afterwards (and I regret to say that it happened in more than fifty percent of the cases) when the case came to trial it was found that there had been no violation of the law, and the case was dismissed.

As an illustration: the Commission issued a complaint against a corporation



Hon. William E. Humphrey

charging it with violating the Clayton Act by acquiring stock in two competing corporations. At the time that we issued that complaint, as was then the custom we gave out a statement to the press in regard to it. They were important parties. The case involved immense sums of money. Several months afterwards when the case came to trial it was discovered that the transaction was perfectly proper and legitimate, that no law had been violated. But what a travesty upon justness and fairness to American business! It was then found that this corporation that was going to acquire this stock had made arrangements to borrow some forty millions of dollars from the bank in order to carry through the transaction, but the publicity we gave to it destroyed its credit so that when the case came to trial the corporation was in bankruptcy. The two corporations that it had proposed to absorb were in bankruptcy. A great and legitimate business was wiped out. Thousands of honest and innocent stockholders had lost all the money that they had invested. The respondent was entirely without redress, and there was nothing to remove the poison that had been injected into the public mind.

The Federal Trade Commission, or rather the majority of it as it is constituted today, do not believe in that practice. We do not believe that is in the interest of the public or that it is in the interest of honest business, and we have abolished it.

We have a rule now that when a complaint is made against a certain party we send out our investigators as we have done in the past. If they submit a report that makes out a prima facie case we give the proposed respondent an opportunity to be heard. He appears before the Board of Review, composed of five, we think, of the best trained lawyers that we have in the Commission. If upon that hearing it appears that there has been no violation of the law the case is dismissed and that is the end of it. If, on the other hand, it appears that the respondent has been guilty of a violation of law, of unfair practices, and the respondent is willing to sign a stipulation that he will cease and desist from such practices and that if he does not carry out the stipulation in good faith it may be used against him, we accept the stipulation, the case is dismissed, and the matter is ended.

I am unable to see how any fair minded person can object to those stipulations. Remember, we have no power to punish; our only power is to issue an order to cease and desist from following up the unfair methods of competition. Why does not a stipulation protect it as fully as an order to cease and desist can possibly do? And remember, we can in many instances secure these stipulations to cease and desist when we cannot possibly secure the evidence to convict.

Again, it seems to me that that system is in harmony with the underlying principles of our system of jurisprudence. It holds out every inducement to settle cases outside of court and to save the expense of litigation. Remember, however, this one thing: there are certain cases that we do not stipulate with. Where the business is in itself inherently fradulent, as in stock selling schemes, these various blue sky propositions, these industrial schools that are robbing the ambitious young men and women of this country of their hard earned money, or where the reputations of the people involved are such that we have reason to believe that a stipulation will not be honestly carried out, we do

*Commissioner, Federal Trade Commission.

Address delivered before 28th Annual Convention of American Mining Congress.

not accept stipulations. We do not stipulate with crookedness. In such case as that we call them to the attention of the Department of Justice, where we think a fraud order should be issued.

But outside of those cases, why should we not accept stipulations? I know the argument that is made, that in every case where a stipulation could be obtained we should proceed to trial and issue an order to cease and desist, for the reason that they want to give advertisement, as they claim, to dishonest practices in this country. I am not stopping to discuss today whether spreading in screaming headlines on the front pages of the details of fraud and vice and crime tend to lessen evil. Certainly many of the best minds in the world do not believe it. But leaving that out of the question, when we are terrorizing the ten percent of dishonest business in this country are we not at the same time terrorizing the 90 percent that is trying to be honest?

And I want to call your attention to this fact, that it is absolutely dishonest to state that there is a clear and distinct line between what is and what is not a violation of the antitrust laws. It is absolutely dishonest to say that you can take always a certain state of facts and draw the line between what is and what is not a violation of the law. It is absolutely dishonest to say that men always knowingly violate the antitrust laws of their country.

Only within the last few weeks two cases of very great importance were decided by the Supreme Court of the United States, and in each of those cases the Court decided five to four, as I remember between whether those facts did or did not constitute a violation of the antitrust laws. And if that Court, the greatest that the world ever saw, the most influential body that ever existed upon this globe—if that great Court, with its great judges, trained in law, trained to weigh facts, cannot of itself agree as to what facts constitute a violation of the antitrust laws how can any sane and honest man say that the business men of this country must always know with certainty whether they are violating the law? So with that thought in mind we have accepted these stipulations.

I think, as the old saying has it, that the proof of the pudding is in the eating thereof. What has been the result of this policy of stipulation that we have adopted? The Secretary has given me the figures as to the workings, and I shall give in detail something of the results that have been accomplished.

The rule was adopted on the 11th day of March, 1925. Of course, it took some time for the rule to come into operation, because it only operated on such cases as were brought after the rule went into effect. Leaving out the months of July and August, when the Commission was not in session so far as hearing cases were concerned, up until the first day of November the rule had been in operation six months. I know of no way to so fairly present the results of the operation of this rule as to compare it with what occurred immediately before, under the old rule.

For the year immediately before March 11, 1925, the Federal Trade Commission issued 53 orders to cease and desist. That is, by these orders they stopped the fraudulent practices of 53 concerns in this country, an average of one a week. And I submit that is not a bad record.

But now what has been the result under this new policy? During the first six months of the operation of the rule for stipulation we have accepted stipulations in 184 cases. In other words, under the old rule the public was protected from fraudulent practices in an average of one case each week. Under the new rule the public has been protected from fraudulent practices in an average of one case each day. In other words, we are accomplishing about seven times as much as we did under the old rule.

I am assuming for the purpose of the illustration that none of those orders to cease and desist, under the old rule, were appealed, which of course is not correct. I might add incidentally that of the appealed orders, issued by the Federal Trade Commission, 63 percent of the cases have been reversed.

At this time when we are all urging economy, when every taxpayer is feeling the burden, by taking these cases and settling them by stipulation instead of going to the expense of a trial we save an average of about $2,500 expense to the Government, to say nothing of the expense to the respondent, in each case. During the first six months of the operation of that rule we have not only accomplished seven times as much as we did under the old rule but we have saved the taxpayers of this country half a million dollars.

Then there is another angle to this rule of stipulation. When I went upon the commission we were about 500 cases behind with the docket. We are now catching up with the docket and it will be but a few months when we will be in the position, that when a case is filed with the Federal Trade Commission we can act promptly. There are cases upon our docket that have been there for from five to nine years. Since this rule of publicity has gone into effect I have spoken in a good many different portions of the country from coast to coast. I have watched the clippings that have come over my desk, taken from publications throughout the country, and I have yet to find an objection by a single American citizen to this rule of publicity, except only that class that wants to spread the propaganda throughout this country that success and dishonesty are synonomous in American business. Perhaps you want to know from whence comes all this tumult and shouting and condemnation that you see in the press of the new rules of the Federal Trade Commission and of those in the majority who have put those rules into effect. It does not come from the business interests of the country; they unanimously approve them. It does not come from the taxpayers of the country, because they are in favor of it. It does not come from the Democratic party, and it does not come from the Republican party, because both of these old parties believe in a Constitutional form of Government and in observing the underlying principles of our system of jurisprudence.

This opposition to the change in the Federal Trade Commission rules comes from that beatific fringe of pink that borders both of the old parties. It comes from that class in this country whose political platform is expediency and whose political creed is that whatever is is wrong, who look upon the world with a jaundiced eye and go about preaching the doctrine that in America success and crookedness are the same thing.

I have said this a good many times, and I should feel that I had not done my duty if I did not repeat, because I want to emphasize that fact. And I know what my words mean. I know their full extent and weight when I say them, and I make this statement without any reservation whatever, based upon the facts that have come to me since I have been a member of the Federal Trade Commission, that the opposition to the change in rules comes from those who fear that under that change they are not going to be able to control the commission for their own personal and political purposes.

I want to repeat what I have said in every speech I have made and what I am going to say in every speech I make hereafter: that so far as I am concerned at least and so far as I can prevent it the Federal Trade Commission is not going to be used as a publicity bureau to spread socialistic propaganda throughout the country.

I will conclude by telling you the mental attidude, as I interpret it, of the majority of the Federal Trade Commission. The majority of the Federal Trade Commission as constituted today do not believe that success is a crime. We do not believe that failure is a virtue. We do not believe that riches are impliedly right or that (*Continued on page* 26)

NATURAL RESOURCES — A NATURAL EXEMPTION FROM THE ANTI-TRUST LAWS

The Old, Drastic Method Of Interpreting Anti-Trust Laws Is Thoroughly Discredited—A New Era Is At Hand—Where Does The Mining Industry Stand In It?

By GILBERT H. MONTAGUE*

WE LIVE in a new age. We breathe a new atmosphere. Never since 1890 has the attitude of the courts, of the administration, and of Government officials been so sympathetic to American business. Never before has it been in anything like the state that it now is. Never before have we been receiving from the Supreme Court decisions so sympathetically interpreting activities of business as has been the case within the past year.

The decisions to which Commissioner Humphrey referred, in his recent address before the American Mining Congress, those two decisions which came down last June, laying down very broadly the rights of trade associations in respect of their activities, relating even to such subjects as past prices, indicate a new era in the attitude of Government toward business, and a new era in the attitude of the courts in their application of the anti-trust laws.

It is in that new freedom, new freedom in the real sense, that a body representing, as does the American Mining Congress, the natural resources of the country should apply itself to a canvass of the situation, as to what practically can now be done, in view of the changed attitude of the Government, the changed attitude of the courts, and the broadened and more sensible and more sympathetic interpretation of the laws, which we now find on every hand.

If there is one thing which has been demonstrated, it is that the old and drastic and inhumane method of interpreting the antitrust laws has been thoroughly tried and found wanting.

For 35 years operators and distributors of coal and other natural resources of this country have been harried by Government investigations, have been pursued by suits for injunctions, have been indicted and placed on trial for violation of the anti-trust laws, have paid fines—and what is the result?

For 35 years, in most instances because of their fear of the anti-trust laws, operators have been afraid, and at the present time are actually afraid, to combine in associations, even for the purpose of collective bargaining with labor.

The chief cause, at the present time, of the paralysis from strikes and the repeated demoralization of the coal industry, is because the antitrust laws have so hamstrung the operation of employers' associations in dealing with labor that they fear it is legally hazardous for them to comply with the suggestions which come at different times from various bureaus and branches of the Government.

There are pending before the country at the present time various proposals from President Coolidge, from Secretary Hoover, from Secretary Davis, from the

Gilbert H. Montague

former United States Coal Commission, and from publicists of lesser note, all of which proposals are partial, restricted, and confined, simply because they are conditioned by what has been the interpretation heretofore given to the anti-trust laws.

They are lame, they are imperfect, they are half-way measures, simply because, in front of each one of them, surrounding each one of them, and intruding into each one of them, is the fear of what the anti-trust laws may be, as they have heretofore been interpreted by the courts.

If there could be any demonstration, anywhere, of the inapplicability of anti-trust laws to any particular branch of American business, 35 years of experience of the natural resources of this country with the antitrust laws has absolutely demonstrated that they are the greatest cause of waste, the greatest cause of lost motion, the greatest cause of high cost, and the greatest cause of loss in distribution, that obtains anywhere in either the operation or the distribution of natural resources.

Why not be bold about this?

Without a single change of the statutes, the Supreme Court of the United States, in a revolutionary set of decisions last June, held contrary to the views of the Department of Justice, and almost, or very nearly, contrary to some preceding decisions of that court itself, that as regards some other branches of business it was so foolish to assume that waste could not be prevented, and that intelligence could not have fair play, that of course the laws must be so interpreted as to permit intelligence to be exercised and waste prevented.

In that set of decisions, which as you read it looks as if it were nothing more than a broad statement by the Supreme Court that intelligence is not a crime, the Supreme Court last June, in those cases relating to trade associations, virtually turned about face, and emphatically stated that hereafter, though there might be a possibility of a violation of law, the law was not necessarily nor invariably violated, if business men, in the exercise of their own individual judgment, in the operation of their own plants, in determining how much stocks they would accumulate, or what prices they would charge, availed themselves of information collected from one another, even though that was done through a trade association—a more revolutionary decision, even, than when the rule of reason was read into the Sherman Act by the Supreme Court in 1911.

And so, in this year of grace Nineteen Hundred and Twenty-five, I conceive it the duty of a body like this, assuming to itself the function of making plans for the natural resources of the United States, to consider just where your industry stands in this new era.

Heretofore, before the courts had gone their present distance in their broad interpretation and sympathetic application of the anti-trust laws, one branch of American business after another had appealed to the Congress, and got relief.

Just read over the number of classes of American business and American industry which heretofore, because of the burden of the anti-trust laws upon them, have asked from Congress, and have re-

*Member New York Bar.

ceived from Congress, special exemptions from the anti-trust laws.

In 1911 the Panama Canal Act was passed. I do not suppose anybody would ever dream, from the title of that Act, that in that Panama Canal Act there was given a special exemption from the Sherman Act. You never hear it spoken of, but the fact is that, in that Act, apparently so far removed from anything relating to the anti-trust laws, every railroad in the United States was given, under certain provisions and certain supervision by the Interstate Commerce Commission, the right to acquire competing waterway connections and special exemptions from anti-trust laws.

In 1914 there came along the Clayton Act, which gave to labor and agricultural and horticultural associations special exemption from all of the anti-trust laws.

Then came the Shipping Board Act. The Shipping Board Act gave to shipping lines the right to meet together and actually make agreements as to their rates, subject only to certain supervision by the Shipping Board. And it gave the right to marine insurance companies to meet together and actually agree on their rates, subject also to certain supervision. They, too, succeeded in joining the magic circle of the exempted class.

In 1918, the exporters of the country appealed to and obtained from Congress, a special exemption from the anti-trust laws, enabling them to get together and agree on prices, so far as related to the export trade. One more special exemption from the anti-trust laws!

In 1921, the packers and stockyards of the United States appealed to Congress, and they got special exemption from the Federal Trade Commission Act, taking them, unlike all the rest of American business, out of that Act, and giving them special rights, subject only to special supervision by the Secretary of Agriculture.

In 1922, the agricultural and horticultural producers and the ranchmen and the nut growers and fruit growers, everybody who had any business at all relating to agriculture, again appealed to Congress, and they got the special right to organize and to combine, both as to production and as to distribution, and other special exemptions from the anti-trust laws.

If you will examine the Interstate Commerce Act, you will find that, at the present time, the railroads are so far removed from the anti-trust laws that they are, as the policy of the Government is now stated, almost compelled to consolidate, and for years they have been virtually compelled to agree on rates. You will also see, in that same Interstate Commerce Act, various exemptions from the anti-trust laws as regards telephone companies.

Successive appropriation acts have expressly provided that such appropriations should not be used for any prosecution under the anti-trust laws against any agricultural or horticultural producers or associations.

When you call the roll, therefore, of exemptions from the anti-trust laws, that have heretofore been granted by special Act of Congress, it is amazing that the natural resources of the United States have been overlooked.

The natural resources of the United States, unlike all these other industries, are industries subject to depletion. When waste in production occurs, it cannot be replaced. When waste in distribution occurs, everybody suffers. And yet that industry, exactly as fundamental as agriculture, and enormously more important because, unlike agriculture, it is subject to depletion, not only has received no exemption, but so far as I can find has not even gone to Congress to ask for any exemption.

If Congress, as this record has shown, has seen fit, during the past twelve years, to grant special exemptions from the anti-trust laws to shipping lines, to railroads, to telephone companies, to exporters, to labor organizations, to agricultural organizations, to horticultural organizations, to ranchers, to stockyards, to packers, and all the rest of them, why should not the natural resources of the country make their perfectly proper appeal, which should be an enormously stronger appeal, for a similar exemption from the anti-trust laws?

That is something about which mining men know better than I, but, from the point of view of one who has watched the administration of those laws, whose practice has brought him into constant touch with them, I can say that to me it is a matter of amazement that, although Secretary Hoover, Secretary Davis, and every other branch of the Government, which in the past ten years has studied the subject, has realized that the wastes due to inability to combine are causing irreparable harm to one of the big industries of the country, that industry has nevertheless not put forth its claim, in a single particular so far as I can see, though all these other branches of American industry and American business have appealed, in each case successfully, for special statutory exemptions from these anti-trust laws.

And so we have, at the present time, the singular spectacle of a coal strike on, and various proposals for the remedying of conditions in the coal industry being proposed by various public men and various organizations, every one of which is obviously and confessedly a halfway proposal, simply because it is to be assumed, apparently, that natural resources shall be one of the few remaining branches of American business which shall continue subject to the anti-trust laws!

I have discussed the legislative question, because the mere recital of these various laws, enacted in the past twelve years by Congress, raises the question as to why the mining industry of the United States has not effectively and forcefully placed its claims before Congress, and obtained the exemptions which it deserves immensely more than these other classes that have obtained them already.

But there is still another phase of this subject, to which we should look.

With the new spirit which now obtains in the courts, in the application and the interpretation of the anti-trust laws, is it not the fact that regional consolidations, and various distributing combinations, can now safely be adopted, in the operation and distribution of our natural resources, to an extent which hitherto you have been afraid to undertake?

Certainly a careful study of the whole trend of the Supreme Court decisions, in the past few years, culminating in those decisions of last June that I have referred to, very conclusively indicates that a new spirit has entered into the Supreme Court, in respect of upholding reasonable combinations which directly will prevent waste and will work real economies in operation or in distribution.

You know, better than I, that there is no industry in the United States which at the present time is so suffering from waste in operation and waste in distribution, because of the fear of operators and distributors to combine.

That fear should be removed, if not by an act of Congress giving an express exemption, then by such regional consolidations and such combinations in distribution as may be tentatively worked out, step by step possibly.

If those things cannot be done, what else is there to do?

Other industries, in other branches of American business, are availing themselves of this new trend of the court toward liberal interpretation of the anti-trust laws.

Every newspaper we open indicates the great degree of consolidation that is going on everywhere.

Other branches of American industry are responding to this new spirit which the Supreme Court has written into the anti-trust laws.

They are doing that, even though they have not any express statutory exemption.

The question is, whether the American mining industry, and those in charge of our natural resources, are

fully alive to what they can now, with very reasonable safety in view of these Supreme Court decisions, actually accomplish even in the absence of new legislation.

Anyone at all conversant with the subject, who would now be consulted on it, would have to agree that we are living in a new era, with the new trend in the interpretation of the anti-trust law, and with the new spirit which is being exemplified, not only in the Federal Trade Commission in the address of Commissioner Humphrey that you have listened to, but also in the Supreme Court itself, and that, to some extent, at least, many of the old fears, which heretofore have kept this industry more hamstrung than any other industry in the United States, are today sufficiently in the background so that we should take new courage.

Perhaps the best way, and I am merely thinking aloud, would be a double attack—an approach to Congress, with a view of showing to Congress the merit of giving to this industry the same exemptions that have been given to others, accompanied at the same time by some effort in the way of such regional consolidations and distributing combinations as will, in the handling of our natural resources, bring about some of the economies which every other branch of American industry is fearlessly accomplishing, at the present time, as anyone can see who watches the newspapers.

This country, in respect of the prosperity which Secretary Mellon spoke of in his Annual Report, as well as in the attitude of its public officials, as exemplified by Commissioner Humphrey and the decisions of the Supreme Court to which I have referred, is moving into a new era.

Those who, during the war, came down here, and saw how the war was saved by the mobilization of American industry, felt very disappointed in 1920, 1921, and 1922, when it looked as if we had dropped back into that old attitude of hostility toward big business. Prosecutions were still going on, and court decisions still looked unsympathetic, and there were some who said, at that time, that the big lesson of the war had been lost. "American business," they said, "had demonstrated at that time that, if allowed to mobilize itself, it could do anything for the public good, and everybody at that time saw it. But the courts," they said, "do not now seem to see it; the Department of Justice does not now seem to see it; the Federal Trade Commission does not now seem to see it; Congress does not now seem to see it; and we have slumped back."

Somewhat tardily, in what has been happening in the past year or two, we now see that those lessons that business was learning so (*Continued on page* 26)

WAR MINERALS FUND CLOSED

ANNOUNCING that all war mineral relief claims had been fully adjusted, liquidated, and paid with one exception, Secretary Work, of the Interior Department, forwarded a final report to the President and Congress practically terminating this work of the Government.

The report shows that the last 90 claims were considered during the past year and that a balance upwards of $950,000 remained unexpended out of the original appropriation of $8,500,000. The report in full follows:

In compliance with the provisions of section 5 of the act of March 2, 1919 (40 Stat. 1272), entitled "An act to provide relief in cases of contracts connected with the prosecution of the war, and for other purposes," known as the war minerals relief act, I have the honor to transmit the following report of administration, including receipts and disbursements, for the calendar year ending November 30, 1925:

Number of original claims awaiting adjustment one year ago	27
Number of appealed claims awaiting adjustment one year ago	8
Number of original claims revived during the year	16
Number of appeals considered during the year	39
Total claims considered	90

Awards to claimants during the year	$249,401.80
Administrative expense for the year	10,486.24
Unexpended balance of appropriation, November 30, 1925	$1,056,119.11

NOTE: Since November 30, 1925, the last remaining claim has been examined and an award of $97,139.50 made in it. The unexpended balance of the appropriation, as shown in the foregoing table, will be reduced accordingly in the final report.

Since the last annual report the Supreme Court of the United States has sustained the view consistently taken in the administration of the act, that repayment of net losses sustained in the purchase of property and mining rights, and reimbursement for interest paid on borrowed capital, were not authorized by the act and its amendments. The court found that the act vested in the Secretary exclusive jurisdiction to construe the act, in making awards thereunder, and that his construction, if reasonable, could not be reviewed by the courts. This ruling foreclosed many claims which, had the ruling been otherwise, probably would have exhausted the appropriation of $8,500,000 without satisfying all claims of like character. In consequence of this ruling the remaining claims have been finally adjudicated by the Secretary, with one exception, wherein claimant's objections to the decision will be heard, and upwards of $950,000 of the original appropriation remain in the Treasury of the United States.

There are now pending in the courts five suits by claimants under the act, each of which challenges interpretations of the act and its amendments by the Secretary. All these suits are being defended as actions taken in the proper exercise of the judgment and discretion vested in the Secretary by the act. The suits involve items which were either specifically ruled upon by the Supreme Court in the decisions referred to, or items which have been consistently and repeatedly, from the earliest administration of the act, denied as not within the scope of said act.

The pending cases are:

1. *The Crimora Manganese Corporation* v. *Hubert Work, Secretary of the Interior*, pending in the Court of Appeals for the District of Columbia.

2. *Hubert Work, Secretary of the Interior* v. *United Chemical and Industrial Companies*, pending in the Court of Appeals for the District of Columbia.

3. *United States ex rel A. H. Jarman* v. *Hubert Work, Secretary of the Interior*, pending in the Court of Appeals for the District of Columbia.

4. *United States ex rel Charles Carpy et al.* v. *Hubert Work, Secretary of the Interior.*

5. *United States ex rel Butte Central Mining and Milling Company* v. *Hubert Work, Secretary of the Interior*, pending upon the law docket of the Supreme Court of the District of Columbia.

All claims have been considered and have been fully adjusted, liquidated, and paid, and no claim remains for adjustment, liquidation, or payment by this department, except one, in which objections will be heard, as heretofore stated. The Secretary regards the administration of the act of March 2, 1919 (40 Stat. 1272), and of all acts amendatory and supplemental to said act fully and finally executed as to all considerations, adjustments, liquidations, and payments of claims, with one exception, as aforesaid, unless at some future time court action in the cases hereinabove referred to should make obligatory and mandatory other or additional considerations, adjustments, liquidations, and payments.

A motion picture film on "The Story of Dynamite," illustrating its use in mining, etc., has been prepared by the Bureau of Mines and will be loaned free on application to its Pittsburgh Station. The picture shows views of blasting lump coal in a Pennsylvania mine and the use of explosives in open pit iron mining in Northern Minnesota.

With best wishes for the New Year from the Nation's Capital

WHAT IS DELAYING AN ANTHRACITE SETTLEMENT?

The Miners Are Suffering And Want To Resume Work And The Operators Have Offered Compromises—What Is Delaying An Agreement?

By GEORGE H. CUSHING

THE continuance of the anthracite strike a single day beyond the 1st of December has been one of the marvels of the time. That is, it is one of the oldest truisms of mathematics that if you can read a problem, it is half solved. On the first of December, the problem had surely been read. Also, the method of working out the unsolved parts had been indicated. There was, therefore, nothing legitimate to delay the solution. Still, it has been delayed. What stands in the way?

To be specific, the men wanted higher wages immediately. The operators proved through five months that they couldn't pay that money out of profits. The consumers, through four months, had declared unequivocally that they were not going to pay any increase of price. It was, therefore, known before the first of December, that an immediate increase of wages could not be granted. That disposed of one aspect of the problem.

Another demand by the Union was that the check-off be granted. The operators have refused it, consistently, for twenty-five years; they refuse it now. All boards of mediation, conciliation, and arbitration heretofore employed, have refused to concede it. There is no reason to believe that any new board now assembled would take a different point of view. There is no more occasion for a strike about that question now than there has been in the last twenty-five years. Therefore, other phrases of the question being disposed of, the dispute over the check-off was no reason for a continued strike. Therefore, that question is out of the way.

John L. Lewis, for the Miners' Union, has been trying to enforce the Jacksonville scale by means of the anthracite strike. To do that, he had to get federal political participation. He played for it for months; finally, on November 21, he demanded it. And, before the end of November, he knew definitely that he was not going to get it. What is more, before the end of November, he had, by a pledge to the President, abandoned any attempt at a bituminous strike. He had also abandoned any hope of federal political participation. Therefore, demands which were unsound economically, or which he knew would not be granted, could not be enforced by political participation. That phase of the problem was disposed of.

The miners' license law of Pennsylvania gives to existing miners a monopoly of the right to mine anthracite. All those who are permitted to mine anthracite have been licensed. John L. Lewis had organized the licensees into his union and had called all of them out on a strike. That stopped the production of anthracite. The hope then was to deprive the people of anthracite and, by creating a coal shortage, to bring pressure to bear upon the operators to yield to his demands. Before the end of November, that whole situation had been cleared up. That is, the consumers had said that they were going through this winter, or an indefinite time, without anthracite. And the people of Pennsylvania had begun a campaign to modify the miners' license law to extract its monopolistic principle. Also, the bituminous industry had so increased its production that it had double discounted the withdrawal of anthracite from the market. The railroads had proved their capacity to carry it. In the latter part of November, without any car shortage, we had established a new high record for the production of coal. That assured the people there would be no shortage of coal this year. With the people willing to use something else; with the bituminous industry supplying something else; and, with the people of Pennsylvania moving to destroy the Union's monopoly in the anthracite field, that phase of the problem is clearly out of the way.

The anthracite miners, themselves, had run through with their money In one week, over 600 of them had turned their automobiles back to the dealers, confessing that they could not make further payments. In some mining towns, soup kitchens had been established. Early in December, Lewis prophesied that money to keep the miners from starvation would be forthcoming. He thus anticipated the appeal which, in the middle of December, William Green made through the office of the American Federation of Labor. It was then proved that the miners could not, on their own resources, continue this strike much longer. That phase of the problem was clearly out of the way.

A strike is a trial by force. If one union hasn't enough force, its force must be augmented by that of others. The other unions, under ordinary circumstances, would have come to the relief of the Miners' Union. This year they have not done so and have confessed that they do not dare. The reason is that—as they explain it—their wages are already too high. Every union is having its own difficulties with its own body of consumers; no union can afford to strike to support somebody else's demands. A typical case is that of the Brotherhood of Locomotive Engineers. It was proved, by figures, that the average of all miners in the anthracite field made over $150 more per year than the average locomotive engineer. And the skilled miner in the anthracite field can make practically double what the locomotive engineer can make. The other unions were not going on a strike, thus jeopardizing their own positions, in order to support the anthracite miners in any such demands. That phase of the problem may be considered to have been disposed of.

The operators, finding that they had reached an impasse with the miners, had suggested arbitration. This was immediately opposed by the Miners' Union. However, before the first of December, the principle of arbitration had been agreed to. The only difference between the two sides was the reservations which should be made when submitting the question to arbitration. That is a slightly more elaborate phase of the question. It is enough, for the moment, to say that, before the first of December, that phase of the problem had been disposed of.

It is thus obvious that every phase of the problem had been taken up, one at a time, and had been disposed of. It remains a mystifying question why the strike should have been allowed to continue a single day beyond the first of December. There is a reason, of course; it will be given in its proper place.

From early in July until today, the question of arbitration has been before both the operators and the miners. When the subject was first mentioned, the Miners' Union feared that the whole question of miners' wages was to be submitted to the board. They might, therefore, be reduced to the level of other workers. There was an excellent human reason for their refusal to submit that big question to arbitration. The skilled worker in the anthracite mines is now able to earn, annually, about twice what the highest skilled railroad employe earns. It is proverbial that a locomotive engineer occupies a hazardous position; certainly his work is as hazardous as that of the anthracite miner. The deadly parallel might have been drawn. The board of arbitration might have decided that the anthra-

cite miners' wages should be cut in half. With that in prospect, there was a reason why the Miners' Union should resist taking such a risk.

As soon as these doubts and fears on the part of the Miners' Union were made clear, the operators proceeded to put a limit, by reservation, upon the decision which the board of arbitrators might reach. That is, they said that they would renew the present contract for five years, with provision that once in twelve months—but not more often—either side had a right to raise any schedule for consideration and revision. Then, if they should not agree, it should be submitted to arbitration. Specifically, as the operators explained it, if the cost of living should rise, the selling price of coal would, of course, rise with it. If, then, the miners should ask for an increase, and the operators should deny it, that question would be submitted to arbitration. But, if the cost of living should go down—if the value of a dollar should rise—and if the selling price of coal should decline with it, the operators might ask for a decrease in the wage schedule. If, under those circumstances, the miners should refuse, that question, also, should be submitted to arbitration. This proposal, therefore, was open at both ends. But the proposal to arbitrate was definitely limited, first, to once in twelve months, and second, to detailed questions, once in twelve months, which could not be agreed upon.

In response to this demand by the operators, Governor Pinchot of Pennsylvania—clearly expressing the view of Mr. Lewis—recognized the principle of arbitration, but made a far different reservation as to the matters to be submitted to the board of arbitration. His proposal was that present wages should be continued for five years as an arbitrary. Therefore, there should never be submitted any question of a reduction in wages, regardless of the trend of the cost of living or the price of coal. And, while stipulating that the price of coal was not to be increased, he suggested that if the operators still were able to make any profit, the question should be submitted to arbitration, whether the miners' wages might not be increased to absorb a part of that profit. profit.

In these two proposals, the principle of arbitration was recognized. The only question was as to the reservations in the questions which should be submitted to arbitration.

The vital difference was that the operators recognized that the selling price of coal in the open market predetermines what the cost of production, including wages, must be. They recognized that anthracite is an integral part of American industry and that it must share the vicissitudes of all other industry. If the general level of prices decline, anthracite prices must decline accordingly. If the price goes down, the cost of production must go down. And, with that cost of production, the wages must also decline. But, if the miner could buy the same standard of living with the wages he would then get as he can buy with the wages he now gets, they recognize there was no injustice. On the contrary, they assumed, clearly, that if all prices should go up, thus indicating a decrease in the value of a dollar, the miner, to maintain the same standard of living, must have more of the, then, cheap money. In detail, the operators were merely making an arrangement through five years to keep the mines in operation and then, annually, to readjust the payment to maintain the present standard of living of the miner, at the then current market price of commodities.

What the Governor of Pennsylvania proposed was that, regardless of the fluctuations in commodity prices, the miners should have the present wages for five years and should rest their hope on getting more on their ability to persuade a board of arbitration to give them a percentage of the profits of the operators.

There is nothing in that difference to justify any group of 150,000 men in remaining on a strike. There is nothing in the situation which, previously, we have described, that would justify a continuance of the strike. And yet, the strike has continued. The operators have let it be known that if necessary, they will pursue this strike for another year. In the newspapers, Mr. Lewis made the statement that as far as he is concerned, this strike will last until the winter of 1926 or the spring of 1927. That is mere bombast, and is no possible justification for a continuance of the strike. That is, it assumes that the miners would continue to strike against their better judgment, merely because Mr. Lewis told them to.

The plain truth of the matter is that the miners have been induced to continue on a strike because they have been led to believe that they could win with political aid. They were led to this belief by the Governor of Pennsylvania who has insisted upon intervening. It is against reason to suppose that men will give up even a losing fight when such a powerful individual as a governor of a state is moving in their behalf. The Governor had promised them the present wages for five years and an arbitration board which might give them a part of any profits remaining to the operators. The moment he proposed that to the Union and the operators, the miners naturally decided that they would wait a while to see whether they could get it. When the operators turned it down, Governor Pinchot appealed to the business men of the anthracite field to bring their pressure to bear upon the operators. If this had not been done, the miners might then have decided to take what they could get. But when Governor Pinchot made his other move in their interest, they decided to wait a little longer. The business people of the anthracite region refused to become a party to any such an effort. When that happened, the miners had another opportunity to go back to work. Before they got a chance to reach that decision, Governor Pinchot had taken another step. He called together the mayors of anthracite cities and asked them to intervene. That caused the miners to decide to wait a little longer.

In other words, with the problem solved and with the way to a fair peace clearly mapped out, the miners and the operators have been held apart by the misguided efforts of the Governor of Pennsylvania. John L. Lewis maintained the strike until the first of December; Governor Pinchot has maintained it since that time.

Each of the 16 coal companies represented on the advisory board for the Cooperative Coal Mining Courses at Carnegie Institute of Technology have agreed to interest at least one prospective student among its employes to take either the two-year or the four-year degree course in coal mining next year.

This action is to be taken in an effort to increase the supply of better-trained young men in coal mine engineering by increasing enrollment at Carnegie and by developing the institution's facilities to train larger groups of mining students each year.

Several of the coal companies are planning to help finance the student's expenses, by either loaning sufficient funds when he enrolls, or by paying, outright, at least half of the expenses. One of the companies will finance the second year for any of its employes who would take the first year of the two-year course, and another has offered to finance any worthy employe wishing to take either a two-year or a four-year course at Carnegie.

The coal companies which have joined in the agreement to interest at least one student each, next year are the Hillman Coal & Coke Co., Vesta Coal Co., Greensburg-Connellsville Coal Co., W. R. Calverley, Inc., Westmoreland Coal Co., Pittsburgh Coal Co., Inland Collieries Co., H. C. Frick Coal Co., Bertha-Consumers Co., Bethlehem Mines Corp., Buckeye Coal Co., Republic Iron & Steel Co., Keystone Coal & Coke Co., Allegheny River Mining Co., Pittsburgh Terminal Coal Corp., and Ford Collieries Co.

NORTHWEST MINING ASSOCIATION MEETS

Mining Men Meet In Spokane For Thirtieth Annual Convention—Mineral Exhibit Attracts Attention

THE thirtieth convention of the Northwest Mining Association, which was held recently at Spokane, Wash., was considered one of the most successful, both in exhibits and attendance in its history.

President Arthur L. Hooper presided at the opening session.

Guests were welcomed by Mayor Fleming and Harlan I. Peyton, president of the Spokane Chamber of Commerce.

Attorney John P. Gray of Coeur d'Alene, Idaho, veteran of many great mining battles, spoke at a joint luncheon of the Chamber of Commerce and mining guests at the Spokane hotel.

Intensive studies in the ore belts have been made by Dean L. O. Howard, of Washington State College, Pullman, who spoke on "Northeastern Washington" at one of the afternoon sessions.

The mineral exhibition held greater appeal than any ever made here, according to the various mining men who aided in its installation. Its hundreds of specimens assembled from Idaho, British Columbia, Oregon, Montana and Washington, and from mines just recently developed.

The Coeur d'Alene regions were represented by large and fine samples of lead, silver, zinc and copper ores from the Burke, Mullan, Kellogg, Wallace, Murray and other divisions, where some of the world's largest and richest mines are situated.

Largest and most comprehensive of the exhibits were those of the East and West Kootenays, districts that lie against the international line in British Columbia.

Washington mining districts represented, included Springdale, Colville, Valley, Daisy, Silver Trail, Old Dominion, Laurier, Leadpoint, Boyds, Pend Oreille, Newport, Republic, Keller and others, and included lead, silver, copper, gold and other metals.

The new copper belt of Baker county, eastern Oregon, was represented by specimens taken from much of an area 30 miles long.

Montana was represented by zonolite from Libby, zinc from Great Falls, gold from Thompson Falls, and lead, silver and zinc from Troy.

North Idaho had silver from Talache, lead-silver from Hayden Lake, lead from Porthill, silver-lead from Lakeview, copper, gold, silver-lead and silver from Clarksfork and specimens from many other well established districts. Idaho county showed its wealth with lode and placer gold specimens.

Flaying "schemers" and urging protection to the real mining men and general public, George D. Porter, state auditor-elect of Montana at an address on "Blue sky" legislation, said in part:

"Mining is a speculation and so is the mercantile business and banking. Real mining men and the public should be protected from schemers and a blue sky law modeled after the Idaho act would be beneficial."

Maurice D. Leehey, attorney of Seattle, was chairman of the program for Alaska Day, December 3. He introduced several speakers including Charles D. Garfield, manager of the Alaska department of the Seattle Chamber of Commerce who spoke on "Alaska Development," Dean Miller Roberts, of the school of mines of the Washington University, "Mining in Alaska During the Current Season;" "Efforts of Federal Reservations," by Falcon Joslin and "Mine Taxation," by Mr. Leehey.

Alfred J. Dunn, an early pioneer of the Coeur d'Alenes and editor of the Wallace (Idaho) Miner, was one of the principal speakers. He said in part:

"Forty years is a long time, whether applied to the life of man or mine. Yet there are many men still with us who were in the Coeur d'Alene district when the Bunker Hill & Sullivan mine was discovered, the 40th anniversary of which was celebrated a few weeks ago. Prior to that time the Coeur d'Alene district referred to the gold belt in what is popularly known as the north side.

"It was gold that placed the Coeur d'Alene district on the map, but it was the discovery of the great Bunker Hill and Sullivan lead-silver vein that extended its bounds and marked the beginning of mineral production that has added almost a billion dollars to the wealth of the world.

"The Bunker Hill & Sullivan long ago earned the distinction of being the greatest lead-siver mine in the world; and, what is more remarkable, after 40 years of continuous production, it is still in position to retain this rank for many years.

"The Morning mine is another that seems to defy time and the insatiable demand for metal. Discovered only a few months after the Bunker Hill, it soon entered upon a career of production covering almost 40 years, a performance that is made more remarkable by the fact that the profits this year are greater than any other year in its history.

"The Gold Hunter, discovered almost coincident with the Morning, although its productive record has at times been interrupted, is still active, and it can be said on authority that the outlook for production is brighter than ever before.

"Hecla, young compared with the mines just mentioned, has, nevertheless, been paying dividends regularly for a quarter of a century and all conditions indicate that another quarter century will still find her going strong.

"These four of the more prominent producing mines are mentioned to illustrate the long life of mines in the Coeur d'Alenes and as evidence of what may be expected of other mines. Possibly some one versed in Coeur d'Alene mining history, but lacking the vision of those stalwart men who made and are making it, may take exception to this reference and point to the Tiger-Poorman, Gem, Frisco, Last Chance, Standard-Mammoth, Hercules and several others that fell short of this long productive life. But this would not affect the broad and incontrovertible proposition which it is desired to emphasize."

Some of the exhibits, Northwest Mining Association Meeting

Dr. D. C. Livingston of the school of mines of the Oregon State College was the chief speaker at one of the sessions. H. E. Hendryx, of Baker, presided. Dr. Livingston's address in part follows:

"I believe that the Snake river country of Oregon has a future and that intelligent development will open a number of valuable properties in that region. Traversing that district are many mineral zones which have been crossed by the flat faults which are characteristic of the Snake river country, and under these faults at the points of intersection are apt to be found copper enrichments."

H. L. Williams, of Grants Pass, Oreg., also (*Continued on page* 30)

LEGISLATIVE REVIEW

Congress Resumes Business—Tax Bill Speeded On Way—President Recommends Coal Legislation—Silver Purchase And Other Important Mining Proposals Suggested

CONGRESS got under way with its new session with a rush. Reconvening on December 7 for the first time since last March, members of Congress were eager to advance their legislative proposals, with the result that it took the Government Printing Office more than a week to print the great number of bills introduced during the first few days of the session. In fact more bills were introduced during the first two weeks of the session than Congress would enact over a period of more than ten years, as hardly more than 600 laws are enacted each year. In the Senate nearly 2,000 bills were introduced while in the House nearly 6,000 were presented. Of course, many of these measures will never again see the light of day.

No time was lost by the House in putting through the tax revision bill. In fact it was introduced and reported to the House by the Ways and Means Committee on the opening day of the session and considered and passed by the House before Congress recessed for the holidays on December 22. Equally prompt action is expected to be taken on the measure by the Senate, whose Finance Committee will take up the bill when Congress reconvenes on January 4. Congressional leaders hope that the bill may be enacted into law before March 15 in order that its provisions may apply to 1925 income tax returns which will be filed on that date. As the bill has the approval of the President and of Treasury and Internal Revenue Bureau officials, as well as of both the Republican and Democratic members of the Committee on Ways and Means, which formulated the measure, the House made no material changes in the bill, and the Senate is not expected to alter it to any considerable extent. In the House debate there was some sentiment for abolishing the capital stock tax, reducing the corporation tax and raising the surtax rates, but this did not result in changing these provisions from the form in which they had been recommended by the Ways and Means Committee. An attack was made on the oil discovery depletion clause but it failed and the provision as written in the new bill by the committee was approved. In explaining this provision Representative Green, Republican, Iowa, chairman of the committee, said:

"The committee feels that the deduction for discovery depletion should be limited somewhat further than it was limited in the revenue act of 1924, and in addition that there should be incorporated in the act the Treasury regulation defining a proven area. Under the existing law discovery depletion is allowable to one who brings in a well upon property proven at the time the well is brought in, if at the time it was purchased by the taxpayer it was not proven. Obviously the benefits of discovery depletion, the purpose of which was to encourage the wildcatter or pioneer, should be limited to those who make an actual discovery. Furthermore, in the interest of certainty and clarity, it is thought advisable to incorporate in the law a definition of what is a proven area.

With these two objects in mind, the committee recommends the amendments of the discovery provision contained in the bill. The new subdivision provides that in the case of oil and gas wells discovered by the taxpayer on and after January 1, 1925, in an area not proven at the date of such discovery, where the fair market value of the property is materially disproportionate to cost, the basis for depletion shall be the fair market value at the date of discovery or within 30 days thereafter of the property proven by such discovery and included within the taxpayer's tracts or leases. The subdivision further provides that in the case of oil or gas wells, each well producing oil or gas in commercial quantities shall be considered as having proven at least that portion of the productive sand, zone, or reservoir which is included in the square surface area of 160 acres having as its center the mouth of such well. The amendment further provides that in case two or more persons enter into an agreement whereby the cost of the well shall be shared if oil or gas in commercial quantities is not found, such well shall not be considered as having proven any part of the tract or lease held by such other persons. The discovery depletion deduction limitation of an amount not in execess of 50 percent of the net income of the taxpayer from the property upon which the discovery was made, provided in existing law, is retained in this provision."

Representative Lozier, Democrat, Missouri, offered, but the House rejected, an amendment providing that discovery depletion be allowed only to a discovery well in a new field.

Tax Losses

Mr. Lozier said this amendment would stop the leak in the revenue law which in the past few years has deprived the Government of probably $300,000,000. He charged that the oil industry is escaping just taxation under the guise of credits for depletion and on account of having brought in discovery or producing wells in territory in which there had been no previous production. He favored the allowance to those who go into new territory and develop a new field. He complained that in administering the law it had been construed so as to give depletion to adjoining land owners who do no development work. Under the law as administered every other land owner in the district can sink wells on the land and if they bring in a producing well they receive the same reduction in depletion and discoveries as the man who

IMPORTANT BILLS REVIEWED IN THIS ISSUE

MINING—

S. 4: Oddie (R.), Nev. War Minerals.
H. R. 5385: Colton (R.), Utah. Gilsonite Leases.
H. R. 5243: Sinnott (R.), Oreg. Potash Leases.
H. R. 3863: Hudspeth (D.), Tex. Potash Deposits.
S. 752: Phipps (R.), Colo. Grazing Districts.
H. R. 4533: Taylor (D.), W. Va. Mine Safety.
S. 576: Pittman (D.), Nev. Silver Purchase.
H. R. 3983: Vaile (R.), Utah. Silver Purchase.
S. 659: King (D.), Utah. Oil Shale Refining Plant.
S. 641: Cameron (R.), Ariz. Concentrated Mineral Deposits.

OIL—

S. 678: McKellar (D.), Tenn. Foreign Restrictions.

COAL—

S. 3: Oddie (R.), Nev. Coal Economics Bureau.
H. R. 5694: Frothingham (R.), Mass. Mine Control.
H. R. 9: Black (D.), N. Y. Anthracite Coal Board.
H. J. Res. 17: Griffin (D.), N. Y. Child labor.

TAXATION—

H. R. 1: Green (R.), Iowa. Tax Reduction.

BLUE SKY—

H. R. 52: Denison (R.), Ill. Stock Sale Regulation.
H. R. 286: Christopherson (R.), S. Dak. Stock Sale Regulation.

STREAM POLLUTION—

S. 94: Wadsworth (R.), N. Y. Mine Drainage.
S. 1717: Ransdell (D.), La. Oil Pollution.
H. R. 5382: Wilson (D.), La. Oil Pollution.
H. R. 3786: Appleby (R.), N. J.. Stream Pollution.

TARIFF—

H. J. Res. 72: Hull (D.), Tenn. Tariff Reduction.

brought in the original well. The first driller alone is the discoverer and entitled to the benefits of the discovery clause. He charged that three-fourths of the so-called discovery wells are not discovery wells, but only an extension of the original discovery well. He did not believe that belated drilling projects should be considered discovery wells or given the benefit of the discovery clause. He charged "maladministration, perversion, and abuse of the discovery clause with reference to oil and gas wells." He said the Couzens committee of the Senate developed that oil companies had withheld from the Government $25,000,000 in their income-tax returns in recent years. "The committee has not as yet more than scratched the surface of these fraudulent tax returns by oil companies hiding behind an unwarranted construction and an unfair administration of the discovery clause," said Mr. Lozier. "Thousands of oil wells in proven territory have been wrongfully getting the benefit of the discovery clause, and the pending bill does not remedy this situation, but perpetuates it by writing a Treasury regulation into the statute, which makes every oil well brought in a discovery well, even if it is in a proven field where millions of barrels of oil have been produced, provided such new well is not closer than one-fourth of a mile from another producing well. All land in an oil district is not oil bearing, but when one or numerous wells scattered over a district has demonstrated that the district is underlaid with rich oil-bearing sand, the new wells brought in in close proximity to the old producing wells should not be considered discovery wells or given the benefit of the discovery and depletion clause. My amendment proposes that additional allowance should apply only to a discovery well in a new field that produces oil or gas in such commercial quantities as to return the capital outlay with a profit and that no new well in a proven field shall be considered a discovery well or given the benefit of the discovery clause unless such well is 5 miles from any other commercially producing oil or gas well. Under the pending bill men who go into a new oil field after it has been proven will get the benefit of the discovery clause on new wells brought in by them if they are one-fourth mile from another producing well. That is not fair to those who drilled the original discovery well and demonstrated that the district was proven oil land. The benefits should accrue only to those who pioneer for oil in new fields."

Depletion Defended

Representative Carter, Democrat, Oklahoma, said the discovery clause was provided in place of depletion. He thought "prospective territory" was a better definition than "proven territory." Mr. Carter denied that one small well could prove a 5-mile territory, and he and Representative Green, Republican, Iowa, chairman of the committee, said the amendment might as well be 50, 100 or 1,000 miles. He said the Couzens committee cases took place under the 1918 act. Mr. Green said Congress had been limiting the allowance in subsequent acts. Mr. Carter referred to the large number of dry wells which were drilled. He had gone into a few oil ventures to his sorrow. Representative Johnson, Democrat, Texas, agreed with Mr. Carter and said that many developments in unproven territory are made by small operators. Mr. Carter said the large corporations, such as the Standard Oil Company, are not real explorers and developers of oil. The large companies do not undertake to control the oil business so much by production as they do by transportation of oil. They wait until the property is developed and then purchase it. If they purchased developed property after 1913 their taxes would be based on the purchase price without regard to discovery. Representative Vinson, Democrat, Kentucky, said oil wells average a production of five or six barrels per day, and that while $4,000,000 might have been invested in equipping wells, $8,000,000 worth of oil might have been produced. Representative Tincher, Republican, Kansas, said that under the Lozier amendment no wild-catter would be able to sell anything. Representative Mills, Republican, New York, said the operator who gets nothing but dry wells and has no income from which to deduct expense, secures deduction for the loss under the depletion and discovery clause when he does bring in oil. Mr. Carter said the amendment would hamper the development and production of oil by independent producers. Increased oil production would not have been possible without the discovery clause and its elimination would decrease production below consumption, causing increased prices of oil products. Representative Blanton, Democrat, Texas, opposed the amendment. Representative Hastings, Democrat, Oklahoma, opposed the amendment and said the criticism applied to the 1918 law.

Representative Green thought the committee had now got the provision "pretty

nearly right." If a 5-mile limit was established it would eliminate all questions of discovery as there could be no discovery unless the prospector went into a new field. About 90 percent of the wells are dry holes and these people "have got to get some compensation or allowance for the risks" and the committee provision is a reasonable allowance and limitatiton. Mr. Lozier said abuses and frauds on the Government "have been and will be practiced."

"If I thought so, I would favor a further limitation," said Mr. Green. "I think the result will be the opposite. There is no occasion for frauds on the Government under this provision."

"In a township 6 miles square you might have one thousand oil wells with 160 acres in the center undeveloped," said Mr. Lozier, "The owner of that acreage could bring in a well and although all the township might have produced a billion dollars worth of oil, he would get the benefit of that discovery."

"Theoretically it is possible; practically it is impossible," said Mr. Green. "Such a case or any thing like it has never happened. It would be more likely that you would have ten thousand wells in the same territory and all but one hundred of them be dry."

Difficulties Removed

Representative Mills said the Treasury Department advised the committee that the new provision in the bill would remove 90 percent of the difficulties in connection with proper application of the depletion clause. Heretofore a man could claim discovery depletion if the well was discovered on territory not proven at the time he purchased it. "We are now providing that in order to get discovery value the territory must be unproven at the time he discovers it, which is very important and far reaching and which will to a large extent remove whatever abuses have existed," said Mr. Mills.

"Under the present law, if you own an acre of land and I own an acre, which adjoins, and you dig a well and discover oil, you get discovery depletion," said Representative Garner, Democrat, Texas. "If I dig a well, and discover oil I also get it, although my well might be within one hundred yards of your well." Mr. Mills said this was because "your acre was unproven territory when you purchased it."

"But under the proposed law, if you dig your well and make your discovery, and I dig and make a discovery, I will not get it," said Mr. Garner. He said the 160 acre provision was used because geologists and engineers say that is as near as possible to define a reasonable point.

Representative Montgomery, Republican, Oklahoma, said oil drillers should be allowed to charge expenses to a discovery well. Over 50 percent of oil is developed and produced by independents. He said the Lozier amendment would stifle the industry and increase oil prices. He complained that the bill did not permit the oil man sufficient latitude, and favored the provision in the present law. He denied that the oil industry had ever taken advantage of the provision, notwithstanding claims of the Couzens Committee.

Unfair To Industry

Representative McKeown, Democrat, Oklahoma, did not think the 160 acre provision was fair to the oil operator. "You have no right to assume that 160 acres is a fair unit," he said. "You may have a thousand barrel well on 10 acres of land and across the road there will not be a drop of oil," he said. "Notwithstanding the theory of geologists," Mr. McKeown said, "nothing but the drill will tell the story."

Mr. Lozier said the Standard Oil Company has acquired thousands of acres in the mid-continent field. Mr. Carter said subsidiaries of the Standard Oil Company confine themselves to developed territory.

The House completed its new committees for the Congress and continued Representative Robsion, Republican, Kentucky, as Chairman of its Mines and Mining Committee. Other members appointed on this committee were:

William Williamson, of South Dakota; Don B. Colton, of Utah; Charles E. Winter, of Wyoming; W. H. Sproul, of Kansas; George F. Brumm, of Pennsylvania; Joe J. Manlove, of Missouri; Arthur M. Free, of California; Edmund N. Carpenter, of Pennsylvania; Dan A. Sutherland, of Alaska; Arthur H. Greenwood, of Indiana; Mell G. Underwood, of Ohio; Joseph Whitehead, of Virginia; Andrew L. Somers, of New York; Butler B. Hare, of South Carolina; and Virgil Chapman, of Kentucky.

The Senate made some changes in its Mines and Mining Committee, which had been appointed at the extra session of the Senate last March, in order to provide places for new Senators. Senator Ralph Cameron, Republican, Arizona, and Senator Rice W. Means, Republican, Colorado, were relieved from the Mines and Mining Committee and their places taken by Senator Robert M. La Follette, Republican, Wisconsin, and Senator Arthur R. Robinson, Republican, Indiana. Senator William M. Butler, Republican, Massachusetts, was appointed chairman of the Committee on Patents.

Committee Chairmen

Chairmen of other House Committees were appointed as follows: Judiciary, Representative George S. Graham, Republican, Pennsylvania; Banking and Currency, Representative Louis R. McFadden, Republican, Pennsylvania; Coinage, Representative Randolph Perkins, Republican, New Jersey; Interstate Commerce, Representative James S. Parker, Republican, New York; Rivers and Harbors, Representative S. Wallace Dempsey, Republican, New York; Merchant Marine, Representative Frank D. Scott, Republican, Michigan; Public Lands, Representative Nicholas J. Sinnott, Republican, Oregon; Indian Affairs, Representative Scott Leavitt, Republican, Montana; Territories, Representative Charles F. Curry, Republican, California; Labor, Representative William F. Kopp, Republican, Iowa; Patents, Representative Albert H. Vestal, Republican, Indiana; Immigration, Representative Albert Johnson, Republican, Washington; Rules, Representative Bertrand H. Snell, Republican, New York.

While the President recommended legislation on the coal industry calculated to avoid fuel shortages during strikes, Congress is not likely to take up the matter until after Governor Pinchot of Pennsylvania exhausts all of his efforts to settle the anthracite strike. Congress will likely wait until after the extra session of the Pennsylvania Legislature, which has been called by the Governor to meet the middle of January, takes action on the situation. While a large number of coal bills have been introduced they have not yet been taken up by the committees to which they were referred.

Among a number of bills which were introduced appeared a bill by Senator Pittman, Democrat, Nevada, directing the Treasury Department to purchase 14,000,000 ounces of silver at $1 an ounce to complete purchases under the Pittman Act. Legislation to pay claims of war mineral producers on account of purchase or lease of property and interest on borrowed money was also introduced. Bills heretofore presented to change the value of the dollar to the basis of commodity prices were again introduced. Bills affecting entry of mineral lands and to forbid the discharge of mine drainage into navigable waters were also presented.

The following is a summary of some of the more important bills affecting mining which have been introduced:

Mining

S. 4. Introduced by Mr. Oddie (Rep., Nev.) Referred to the Committee on Mines and Mining. This bill proposes to authorize the payment to war mineral producers of net losses in connection with the purchase or lease of property and for interest paid on borrowed money.

H. R. 5385. Introduced by Mr. Colton (Rep. Utah). Referred to the Committee on Public Lands. This bill applies the mineral leasing law to asphalt, gil-

sonite, elaterite and other like substances on public lands. Prospecting permits for 640 acres of land are authorized. If the permittee discovers these substances he could secure a lease upon which he would pay a royalty of 50 cents per ton and an advance rental of 50 cents per acre per year. The leases would run for 20 years.

H. R. 5243. Introduced by Mr. Sinnott (Rep. Ore.). Referred to the Committee on Public Lands. This bill authorizes potash prospecting permits on 2,560 acres of land for two years, except on lands near Searles Lake, California, which lands may be leased. If the prospector discovers valuable deposits of potash he could secure a 20-year lease upon a royalty payment of 2 percent of the quantity or gross value of the output, and an advance rental of 25 cents per acre for the first year; 50 cents for the second, third, fourth and fifth years and one dollar per year thereafter.

H. R. 3863. Introduced by Mr. Hudspeth (Dem. Tex.). Referred to the Committee on Mines and Mining. This bill appropriates $5,000,000 for investigations during the next 5 years by the Geological Survey to determine the location and extent of potash deposits.

S. 752. Introduced by Mr. Phipps (Rep. Colo.). Referred to the Committee on Public Lands. This bill, which establishes grazing districts for livestock on public lands, guarantees the right to prospect and mine on the land. One provision is to the effect that the use of timber, stone, gravel, clay, coal and other deposits may be enjoyed by settlers, miners, and prospectors for mineral, for firewood, fencing buildings, mining, prospecting and other purposes. The bill will not restrict the use of any water on public lands in the grazing districts for mining, or milling purposes or prevent the entry or exit over public lands for prospecting, locating, developing, entering, leasing, or patenting their mineral resources.

Mine Safety

H. R. 4533. Introduced by Mr. Taylor (Dem. W. Va.). Referred to the Committee on Mines and Mining. It is designed to encourage and aid in the introduction of safe and efficient practices in mining. It authorizes the Bureau of Mines to assist through exhibits, demonstrations, and advice and in other ways, States and individuals in developing mine safety practices. Cooperative agreements may be made by the Bureau for this purpose and for research within the jurisdiction of the Bureau, including the detail of personnel for service under such agreements. The cost of these agreements shall be equally divided between the Government and those with whom arranged. The Bureau is authorized to issue to miners an annual publication containing information which may increase safety, health and sanitation in the mining and metallurgical industries. The Bureau is also authorized to make scientific and technical investigations of explosions and fires caused by explosives in mines, etc., in order to recommend safe methods of manufacture, storage, distribution and use of explosives. These conclusions will be reported to Federal, State and city authorities for legal action occasioned by wilful act of persons or for precautionary methods if the explosion was accidental.

S. 576. Introduced by Mr. Pittman (Dem. Nev.). Referred to the Committee on Banking and Currency. This bill directs the Treasury Department to purchase 14,589,730 ounces of silver at $1 per ounce to complete purchases under the Pittman Act of 1918. This bill is based on the fact that the Treasury assigned Pittman Act silver for subsidiary coinage and did not replace it with silver purchases. The bill was drawn after a sub-committee of the Senate Gold and Silver Commission investigated the subject. The Senate passed the measure in the last Congress but it was not reached by the House. The Treasury Department has opposed this bill, based on an opinion of the Comptroller General.

H. R. 3983. Introduced by Mr. Vaile (Rep. Colo.). Referred to the Committee on Banking and Currency. This is similar to the foregoing. It also proposes to repeal the Pittman Act.

S. 659. Introduced by Mr. King (Dem. Utah). Referred to the Committee on Mines and Mining. This bill appropriates $300,000 for an experimental petroleum shale refining plant at Ogden or Salt Lake to investigate and develop methods for extraction of petroleum from oil shale in order to increase the supply of petroleum. These investigations and experiments would be under the Bureau of Mines.

S. 641. Introduced by Mr. Cameron (Rep. Ariz.). Referred to the Committee on Mines and Mining. This bill would permit the location and purchase of lands containing concentrated mineral deposits of gold, silver, cinnabar, lead, tin, copper or valuable minerals in horizons or in belts or zones underlying a non-mineral over-burden or sedimentary deposits in surveyed and unsurveyed lands. Claims to such lands would not exceed 640 acres. This bill was introduced by the Senator at the last session. Locaters would be allowed four months to begin work on a mining claim and thereafter would be required to spend $3,200 on the claim during each year. After discovering valuable minerals and expending not less than $6,400 on the claim the locater could obtain patent thereto.

Oil

S. 678. Introduced by Mr. McKellar (Dem. Tenn.). Referred to the Committee on Foreign Relations. This bill would forbid persons of foreign countries from acquiring oil or oil shale lands or an interest in oil or oil shale products in the United States if their countries forbid Americans from engaging in such activites in foreign lands. The bill would also forbid the exportation of oil or oil shale to such foreign countries.

Coal

S. 3. Introduced by Mr. Oddie (Rep. Nev.). Referred to the Committee on Mines and Mining. This measure provides for the creation of a Bureau of Coal Economics in the Department of Commerce to collect information and conduct investigations designed to stabilize conditions in the coal industry. The bill follows the lines of a similar measure introduced by the Senator during the last Congress. It authorizes advisory committees of representatives of the anthracite and bituminous industries to confer with the Secretary of Commerce on matters affecting the industry. The Secretary of Commerce and the advisory committees would consider plans for storage of coal by consumers; supply and distribution in emergency; adjustment of royalty rates; taxation policies, particularly as to reserve coal lands; prevention of waste in mining; improvement in underground mining; removal of restrictions on output; introduction of machinery; relief from irregular operation and over-development; integration of the industry into larger productive units; improvements in preparation of coal; training of mining engineers and foremen; accident prevention and compensation; improvement of living conditions in mining communities; improvement in transportation, including mine rating and car distribution; elimination of needless cross and long hauls; bulk handling at yards and ports; standardization of contracts, inspection and grading; wholesale methods, retail costs and methods, and cooperative marketing and buying; promotion of export coal trade; standardization of accounts and reports; constructive activities of coal trade associations; economy in the use of fuel and power and improvement in gas and coke manufacture; labor relations, including reduction of absenteeism and labor turnover; improved machinery for adjustment of grievances and negotiation of wage agreements. Recommendations on these subjects would go to Congress.

The Secretary of Commerce is required to develop a plan for consolidation of larger producing units or cooperative selling agreements in the coal industry to provide regular employment, lower production costs, and reduced prices. The bill establishes a coal inspection service to provide for shipment of standard quality coal. In case of a suspension of mining the President is authorized to appoint

an investigator to examine the cause of the dispute. The Secretary of Commerce is to report to Congress a plan for emergency control of coal distribution during a national shortage. It also authorizes the President to appoint a federal fuel distributor in a national emergency and for cooperation of the Interstate Commerce Commission in car-distribution.

UNDER-SECRETARY OF MINES

The bill creates an Under-Secretary of Commerce in charge of Mines and Mining who would be in charge of the Bureau of Coal Economics, the Bureau of Mines, and other activities of the Department of Commerce relating to mines and the mining industrty.

H. R. 5694. Introduced by Mr. Frothingham (Rep. Mass.). Referred to the Committee on Interstate Commerce. This bill authorizes the President to declare an embargo, complete or partial, on the exportation of coal, either anthracite or bituminous, or both. It also authorizes the President "to take over and run the mines, when in his judgment a national emergency exists in the coal situation."

H. R. 9. Introduced by Mr. Black (Dem. N. Y.). Referred to the Committee on Interstate Commerce. This bill creates a U. S. Anthracite Coal Board of three members at a salary of $100,000 per year each, or $25,000 more than the President's salary. The Board would be constituted into a corporation with authority to take over by condemnation or seizure, any anthracite mines and coal in the United States, except that on premises for heating and coal held by railroads. It can also take over any property used in anthracite mining, together with the books and papers of persons engaged in the coal business. The bill appropriates $2,000,000 to enable the corporation to issue a like amount of bonds, all of which would be subscribed by the United States for use in carrying out the law, the bonds to be secured by the property seized. The corporation would employ labor to mine, sell, transport and distribute coal to dealers and consumers. It would arrange with the union to secure labor and check off the miners union dues. Owners of the mines taken over could file objections to wage rates in excess of those prevailing when the present anthracite strike began. These excessive wages would be retained by the corporation as an anthracite wage trust fund, which would be paid the owners of properties seized after the President terminated the corporation, on the basis of the earnings of each owners' property together with all other property taken from the owners. The corporation would recommend to Congress legislation affecting the anthracite industry.

H. J. Res. 17. Introduced by Mr. Griffin (Dem. N. Y.). Referred to the Judiciary Committee. This resolution proposed a constitutional amendment giving Congress power to prohibit the employment of persons under sixteen years of age in mines, quarries, mills, canneries, workshops, factories, or manufacturing establishments, and to prescribe the conditions of such labor therein of all persons over the age of sixteen years.

TAXATION

H. R. 1. Introduced by Mr. Green (Rep. Iowa). Reported by the Ways and Means Committee and passed by the House. This is the new tax reduction bill.

BLUE SKY

H. R. 52. Introduced by Mr. Denison (Rep. Ill.). Referred to the Committee on Interstate Commerce. This is the so-called "Blue Sky Bill" and seeks to regulate the issuance of securities, including those representing an interest in an oil, gas or mining lease. The law would be enforced by the Department of Justice. It is similar to a bill introduced in the last Congress and debated in the House, without a vote being reached thereon.

H. R. 286. Introduced by Mr. Christopherson (Rep. S. D.). This is similar to the foregoing except that it is to be administered by the Post Office Department.

STREAM POLLUTION

S. 94. Introduced by Mr. Wadsworth (Rep. N. Y.). Referred to the Committee on Interstate Commerce. This bill proposes to forbid the discharge of oil from vessels, mines, etc., into coastal navigable waters.

S. 1717. Introduced by Mr. Ransdell (Dem. La.). Referred to the Committee on Commerce. This bill designates the Secretaries of War, Interior, and Commerce as a board to fix regulations to prevent the pollution by oil from oil wells, terminals, refineries, tanks, or storage places into navigable rivers.

H. R. 5382. Introduced by Mr. Wilson (Dem. La.). Referred to the Committee on Rivers and Harbors. This is similar to the foregoing.

H. R. 3786. Introduced by Mr. Appleby (Rep. N. J.). Referred to the Committee on Rivers and Harbors. This bill makes it unlawful to discharge oil or refuse of any kind into tributaries of any navigable water.

TARIFF

H. J. Res. 72. Introduced by Mr. Hull (Dem. Tenn.). Referred to the Committee on Ways and Means. This resolution proposed to express the sense of Congress that existing high tariff rates should be revised downward to a level of moderate revenue, which would not destroy or materially injure any efficient domestic industry economically justifiable, nor afford shelter for excessive or extortionate domestic prices. The resolution says the employment of capital and labor and the prosperity of the country depends upon the exportation of surplus products, to accomplish which requires increasing efficiency and lower production costs, against which existing high tariffs on raw materials and manufacturers greatly militate.

A NATURAL EXEMPTION TO ANTITRUST LAWS

(*Continued from page* 18)

1917 and 1918 have at last been learned by Government officials and by the courts.

Somewhat tardily, the Supreme Court, as in these recent decisions, has indicated its intention, from now on, to support such combinations as reasonably will prevent waste, and to enable American intelligence to continue to function, so long as it does so fairly, even to the extent of combining in big business.

Very recently, as recently as last March, to repeat the date which Commissioner Humphrey mentioned, the Federal Trade Commission came to that same view.

And so, even if Congress does not at present feel justified, because of the pressure of other business, to give you the exemption which it has so freely given to all these other specially favored branches of American business, is not the time ripe when those in charge of our natural resources, the operators on their side and the distributors on their side, may enter more boldly into cooperative enterprises, or even regional consolidations, for the purpose of bringing, to this distraught industry, some prevention of waste, and some saving of lost motion, in respect of production and distribution, and finally bring this industry into line with all the other branches of American business?

CHANGING ECONOMIC CONDITIONS

(*Continued from page* 15)

poverty is impliedly wrong. We do not believe that energy and industry and integrity and brains should be penalized. We do not believe that incompetency and extravagance and dissipation and failure should be glorified.

We believe that 90 percent of the business of this country is honest in trying to obey the law. We want to help the 90 percent. We want to suppress or control the ten percent that is dishonest. We believe that in making that fight we are making a fight in the interest of honest business. We believe that we are making it in the interest of the American public We believe that we are making it in your interest. If you agree with us we want your help. We hope to deserve it.

BUREAU OF MINES MAKES ANNUAL REPORT

Director Of Bureau Of Mines In Annual Report To Secretary Of Interior Gives Interesting Data Concerning Activities And Investigations Now Under Way—Safety Work, Health Survey And Many Technical Problems Covered

APPROXIMATELY 140,000 workers in the mineral industries have now been trained in mine rescue and first-aid methods by employes of the Bureau of Mines, according to the annual report of the Director, submitted to the Secretary of the Interior because of its covering a period before the recent transfer of the Bureau to the Department of Commerce. The chief purpose of the Bureau's recently organized safety extension service will be to give advanced training in rescue work and bring to the attention of mine officials the latest advances made in the prevention of mine fires and explosions and in the conduct of rescue operations and disasters. The Bureau has also recently begun a campaign for greater safety in the petroleum industry.

Coal Dust Explosions

The Bureau is continuing the investigation of the explosibility of the dusts of different coals, the ways in which mine gases or dusts may be ignited, and the manner in which an explosion traverses mine workings. Following a series of tests at the Bureau's experimental coal mine which have demonstrated how wide-spread coal-dust explosions could be prevented by coating the walls, roof and floor of mine passages with rock dust, operators of bituminous mines in different parts of the country are rock dusting their mines. One state now requires that rock dust be used in all coal mines, and several states specify its use as an alternate to watering the mine. Cooperation with the British Department of Mines, directed more immediately toward research on the betterment of coal-mine explosives, the use of electrical equipment in mines, and the best methods of preventing the propagation of explosions, was continued during the year.

Health Survey

In cooperation with the Public Health Service, the Bureau of Mines is conducting a health survey at coal mines in different states, with the view of determining possible ill effects of breathing air carrying fine particles of coal dust, and the healthfulness of the conditions to which the miner in the average coal mine is exposed.

A carbon monoxide recorder developed at the Bureau's Pittsburgh experiment station, and which is so sensitive that it detects as little as one or two parts of carbon monoxide in 1,000,000 parts of air, has been installed at the Liberty Tunnels in Pittsburgh.

Although the use of respirators by men exposed to injurious dusts has long been advocated, progress in their adoption has not been as rapid as the health hazard warrants. A new dust respirator with high filtering efficiency and a low resistance to breathing has been developed by the Bureau.

Helium

Helium, the rare gas used in the giant dirigibles, seems likely to find a new and important use in the conduct of diving and tunneling activities as the result of tests made at the Bureau's Pittsburgh experiment station. When mixed with oxygen, helium forms an atmosphere that is as breathable as normal air, and the tests indicate that the use of helium—oxygen mixtures materially reduces the time of decompression—the process to which divers and men who have worked in compressed air are subjected before they enter outside air. As a consequence the hazard of compressed-air illness, or caisson disease, among tunnel workers and divers can be greatly lessened.

Fuel Saving

Methods and equipment by which great savings of fuel can be effected at central power stations, at small boiler plants, on steam locomotives, and in private residences have been called to the attention of the public through the fuel investigations of the Bureau. The Bureau has been instrumental in developing standard methods for sampling, analyzing, and testing solid, liquid, and gaseous fuels. It has published many thousands of analyses and has placed at the disposal of the public comprehensive data on the fuel resources of the country—data such as are available in no other country in the world. Instruments and apparatus that the Bureau designed for measuring temperatures and analyzing flue gases are used by makers of boilers and by power-plant engineers. In publishing the results of steaming tests the Bureau has made plain to designers of power plants and the users of fuel how the capacity of boilers can be increased and a pound of coal can be made to evaporate more water. Some of the Bureau's reports have been used as advanced textbooks in technical schools and colleges.

Use of Low Grade Coals

In its efforts to conserve the supply of high-grade coals through the use of those of lower grade, the Bureau has shown how lignite can be utilized more efficiently and has demonstrated that low-grade Middle West coals can be used for making city water-gas in place of the more expensive eastern cokes. The Bureau has taken an active part in campaigns to lessen the smoke nuisance in cities, has shown how coal can be burned without the production of dense smoke, and has studied the processes that look to the disuse of raw coal as fuel. The Bureau has also determined the comparative value of different fuels—as coal, wood, and coke—for house-heating boilers and has shown the householder how he can reduce his coal bill.

Blast Furnaces

During the past year the experimental blast furnace maintained at the Minneapolis experiment station was used in a study of the problem of the utilization of maganiferous iron ores which occur in enormous quantities in several districts of the United States. It is estimated that the domestic supply of ore containing more than 35 percent of manganese, indispensable in the present art of steel making, would be exhausted in three years at the current rate of consumption.

Surveys in Alabama have shown vast quantities of iron ore that is too low for making iron under present conditions. The beneficiation of this ore to get a product that can be profitably smelted is being studied by the Bureau's Southern station, at Birmingham-Tuscaloosa, Ala.

A process for the production of ferric sulphate and sulphuric acid from sulphur dioxide and air, the sulphate and acid to be used for leaching mixed copper ores, has been developed at the Bureau's Southwest experiment station, Tucson, Ariz. It is hoped that this process may be utilized in the treatment of typical mixed copper ores of the Southwest, of which large tonnages are available.

Complex Ores

The Bureau's Intermountain experiment station at Salt Lake City has given special attention to the treatment of low-grade and complex ores of lead and zinc, because these ores constitute possibly the largest source of supply of lead in this country. Flotation tests of pure galena, sphalerite, and pyrite have given results that are being applied in the industry. As a result of the flotation research undertaken at the station and by the operating companies in the state, the Utah zinc industry has been built up from practically a nonproducer into one of the largest in the West.

Enormous economies are theoretically possible in various metallurgical operations by the substitution of oxygen or oxygenated air for ordinary air. With the assistance of an advisory committee the Bureau of Mines is working on the problems involved.

New Uses of Silver

In the course of the study looking toward the possible development of new uses for silver a large number of silver alloys have been examined. A dozen alloys, chiefly those based on zinc or cadmium as the main alloying element, can be made of sterling fineness, are suitably workable, and have satisfactory appearance and properties which are decidedly more resistant to tarnish than ordinary sterling. An investigation has been made of unstable silver compounds with a view to their use in place of mercury fulminate as detonators of high explosives.

Great advances in the treatment of low-grade and complex ores have resulted from work done by the Bureau of Mines, it is pointed out. Among the problems the Bureau has aided the mining industry to solve are the separation of zinc minerals in an ore from those of lead and iron by selective flotation; the recovery of lead from oxidized ores by brine leaching; and the recovery of the silver, lead, and some of the gold from complex semioxidized silver-lead ores by combined chloridizing roasting and brine leaching. Possible improvements in the treatment of quicksilver ores have been pointed out, and an efficient process for recovering silver from rebellious ores that carry manganese has been developed.

Oil and Gas Industry

The Bureau of Mines has pointed out methods of preventing, or at least greatly reducing, enormous losses that have prevailed in the oil and gas industries. Operators have been impressed with the advantages in the use of mud-laden water for protecting well casing from corrosive waters, keeping water from entering oil-bearing sands, and preventing the escape of oil or gas into porous beds penetrated in reaching a productive formation. The Bureau has also called attention to the use of cement for sealing off waters below or above producing strata, and has shown how "wild" wells could be controlled.

Oil Shale

When attention was called to the vast deposits of oil shale in Colorado and adjacent States and their value as potential sources of motor fuel, the Bureau began investigating the composition of these shales and the recovery of gasoline and other products from them. The Bureau has studied the types of retorts used in Scotland and other countries where oil shales have been worked, has made many small-scale tests, and has accumulated a large mass of data bearing on temperatures, rate of distillation, and other factors that determine the yield and quality of the products. Congress in 1925 made an appropriation for the construction of a pilot distillation plant to be operated by the Bureau. A site for this plant has been surveyed in Colorado and plans for the layout of the plant and specifications for the necessary equipment are being prepared.

The Bureau has studied the problem of preventing or lessening the enormous financial losses caused every year by the corrosion of oil-field equipment. In many oil fields are porous beds containing waters that quickly corrode iron and steel equipment, riddling well casing in a few months. Entire fields have been damaged or ruined by water that entered the productive sands through corroded casing. In Kansas alone the losses from underground corrosion in the producing fields are believed to exceed $3,000,000 yearly.

In many oil fields the deposition of paraffin from the crude oil entering a well is a problem of major importance. In one field in the Rocky Mountain region the cost of removing paraffin from rods and tubing in 1924 was more than $500,000. Laboratory study of the characteristics of the wax has indicated that removal methods cheaper and quicker than those in use are possible. A study of production methods has also indicated that often the deposition of paraffin can be prevented.

A process for cracking tars and heavy oils and thus obtaining gasoline and illuminating oils from them has been devised, which it is believed can be applied to natural tars and to extracting oil from oil-soaked sands, such as exist in enormous quantities in certain California counties.

The rapid increase in the use of oil as fuel on seagoing vessels has made the pollution of coastal waters by oil a matter that cannot be regulated satisfactorily by individual nations. Many maritime nations have passed laws to prevent, or to reduce to a minimum, the pollution of their territorial waters by oil, but as no nation has jurisdiction over the open sea there is nothing to prevent waste oil being discharged there and carried by wind and waves into territorial waters where it may become a source of damage and possible danger. At the request of the State Department, the Bureau is studying the changes that occur in oil discharged on the open seas and exposed to the action of wind, waves, and sun for some time.

Although most desired as a lifting gas for balloons and airships, helium will undoubtedly find other uses if the cost of production can be lowered. For instance, it can be used instead of nitrogen in electric light bulbs. Practically all the helium now available, however, is recovered from natural gas by the Government plant at Fort Worth, Tex., and is controlled by the Government. Research into the recovery of helium began during the World War, and in this research the chemists of the Bureau of Mines have taken a leading part. At Washington the Bureau has a cryogenic laboratory where experiments relating to the recovery and purification of the gas are carried on. The Bureau also has charge of the recovery plant at Fort Worth, Tex., and directs work at repurification plants at aviation fields where helium that has been used in balloons or airships is freed from the atmospheric gases that have diluted it.

Clays

The Bureau has demonstrated that many American clays regarded as unavailable for white wares can be purified for use in making the highest quality of porcelain, has established that some American bond clay can be used with as good effect as imported clays in the manufacture of crucibles, and has devised methods for the use of dolomite as a substitute for the more expensive magnesite in the manufacture of refractory brick. It has shown how fuel can be saved and the time of burning reduced at many kilns producing brick, tile, and other heavy clay products, and has contributed to the development of more resistant refractories for use at metallurgical plants and in high-duty boiler furnaces.

CONSTITUTION OF COAL

RESEARCH on the constitution of coal, cannel coal, boghead coal, and oil shales is being continued by R. Thiessen, research chemist at the Pittsburgh, Pa., experiment station of the Bureau of Mines. The purpose of the investigation is to study the structural, chemical, and physical composition of coals and bituminous shales. Such knowledge is of recognized importance in the coking and recovery of by-products in coals; in the distillation of oil shales, and the recovery of their products; in the experimentation of liquifying coals, and in the most efficient utilization of the fuels. A detailed study of the origin of coals and bituminous shales is being continued. At present the study is being centered on how far the plant compounds were changed, and what compounds have remained unchanged during peat-forming and transformation into low-rank coals.

CONFERENCE ON GOVERNMENT IN INDUSTRY

One Hundred And Eighty Industrial Leaders In Convention Form Coalition Organization, With Headquarters At Washington, To Protest Further Encroachment Of Government In Business

By IRA L. SMITH *

A REBELLION by industry against the constant and growing intrusion of the Government into the field of business activity is taking form. After watching bureaucracy extend itself amazingly during the post-war years, leaders engaged in all types of business pursuits are now planning to offer stubborn resistance to encroachments upon private initiative.

These plans call for a strenuous campaign, to be exercised by the leaders of more than 100 industries in all parts of the country simultaneously. The campaign will be under the coordinating supervision of the Conference on Government in Industry, a newly formed body that will function through the medium of an executive committee elected recently at a meeting held at Washington.

The Conference on Government in Industry will establish headquarters in the National Capital, but will in no way approach the role of "a new organization." The 180 industrial leaders attending the conference at Washington which saw plans for campaigning crystallized were of a voice in declaring enough "organizations" are already in the field. Rather to carry out the plan to curb encroachment by Federal, state, county, and municipal governments, it was determined to set up a coalition under which the existing forces would be enabled to act in concert, unhampered by a bulky mass of organizational handicap.

The American Mining Congress, represented on the floor of the conference by Dr. Henry Mace Payne, expressed its intention to lend its fullest strength to the movement to suppress Government competition, which is at least a first cousin of Government regulation of industry. In doing this the Mining Congress joined with scores of the staunchest industrial bodies of the nation.

The national phase of the coalition's activity will be seen in an effort to be inaugurated to halt appropriation of public funds for use by bureaus of the Federal Government in purely commercial activities. But this national phase will by no means be the predominant one. For leaders declare intrusion by the state, county, and municipal agencies are "even more vicious" than those of the Federal body.

First plans for the movement to enforce the principle that the "functions of government are political and not economic" were laid at the meeting held here December 10-11.

The following were named as members of the executive committee: Homer L. Ferguson, president, Newport News Shipbuilding and Drydock Company, Newport News, Va.; F. Highlands Burns, president, Maryland Casualty Company, Baltimore, Md.; J. E. Edgerton, president, Lebanon Woolen Mills, Lebanon, Tenn.; S. M. Williams, vice-president, Autocar Sales and Service Company, Ardmore, Pa.; and Gen. R. C. Marshall, Jr., general manager, Associated General Contractors of America, Washington, D. C.; Mr. F. J. Koster, president, the Koster Company, San Francisco, Calif.; W. D. Washburn, president, American Hoist and Derrick Company, St. Paul, Minn.; Martin Insull, president, Middle West Utilities Company, Chicago, Ill.; Elmer Bliss, president, Regal Shoe Company, Boston, Mass.; G. S. Brown, president, Alpha Portland Cement Company, Easton, Pa.; and Harry Scullen, president, Scullen Steel Company, St. Louis, Mo.

The conference adopted a report declaring that industrial enterprises already in operation or contemplated by government, municipal, county, state and Federal "are of such magnitude and diversity of character that they are seriously endangering numerous private industries." Continuing the conference's report said:

"Government enterprise pays no taxes. When Government displaces private business, the loss in taxes as well as the excessive cost of operation is levied upon property and business which survives. The national defense is best and most economically served by private business enterprises which may be converted to war purposes in case of emergency."

"Government enterprise almost invariably incurs a loss far exceeding any possible profit. These losses constitute an unjustifiable waste of public money. Costs of government are concealed from the public by neglect to employ a system of cost accounting which fully reveals the total expense.

"Government in business drives citizens out of legitimate occupation. It discourages business which is threatened. It squanders the money of the taxpayers, increasing their burdens. It is marked by extravagant delays, public inconvenience and loss. It deludes those engaged in agriculture, industry and commerce with estimates of cost in undertakings for which they must pay, piling up costs in excess of estimates under no responsibility or check."

"Government and industry must be protected against the assaults of those who would destroy both by confusing the functions of each. The door of opportunity must be kept open.

"We call upon every citizen to take stand squarely upon the proposition that the American Republic is founded upon the private ownership of property and maintained by the private enterprise of those engaged in gainful occupations."

The conference formally asked that government, whether municipal, county, state or federal, abstain from business in which citizens "may properly and legitimately engage." Every group of those who conduct or serve industry were urged to adopt this policy as "affecting their particular vocations and to join in cooperation among the several groups to establish and maintain it."

The conference outlined plans:

To disseminate among the people correct information as to the extent, cost and results of governmental enterprises.

To urge that in all government operations there be established a recognized and adequate system of cost accounting; and that all existing prohibitions against rewarding labor on merit and efficiency be abandoned.

To inform the people that government in business means the establishment of a socialistic state and the ultimate destruction of all individual opportunity.

To oppose every existing or proposed intrusion by government into the proper field of private enterprise.

The membership of the conference was cited as being composed of the following three classes: trade association; business and professional organizations, and companies or individuals whose interests are or may be directly affected.

During the course of the conference, more than half the members of the conference indicated the penetrations which state, county, municipal and federal agencies have made into their fields of activity and outlined the tendency toward further intrusions.

The effect of dust in trades on the health of workers is being investigated by the U. S. Public Health Service in the anthracite, cement, granite, and silver polishing industries. The Health Service states that while granite workers show a high morality rate from tuberculosis and those in the anthracite industry show a very low rate, it may be possible that the anthracite worker loses more time due to bronchitis, pneumonia, asthma, and other respiratory diseases than do workers in silica dust.

*Editor, The Constructor.

HEALTH AND SAFETY STANDARDS ADVANCED IN BUTTE DISTRICT MINES

NOTABLE advances in health and safety standards have been attained in recent years in the great metal mining district of Butte, Montana, states the Bureau of Mines, following an investigation of conditions in that district. The improvement along safety lines in the Butte district is typical of improvement recorded in other large metal mining centers of the United States within recent years.

No other metal-mining district now being worked in the United States can show such intensive mining in a small area, and probably in none have the mine operators to cope with more difficult mining conditions, state G. S. Rice, chief mining engineer, and Dr. R. R. Sayers, chief surgeon, in a report just issued by the Bureau of Mines. High rock temperatures in the deep workings, heavy ground requiring extensive timbering with consequent danger of disastrous mine fires, and in addition the potential danger to health by dusts produced in mining siliceous ores must all be met.

The Bureau's investigations of conditions in the Butte district began in 1916. At that time miners in many places in the mines worked in hot, humid air with little or no movement. Bad fires in old stopes were inclosed as well as possible by fire walls, but poisonous gases occasionally leaked through the ground. A few mines had only one shaft—that is, only one means of exit in the event of a fire or other disaster. Few of the mines had adequate ventilating fans on the surface, and these fans were not reversible. Dry drilling was general and no spraying was done; the miners were subjected to breathing siliceous dust; miners' phthisis was prevalent and the death rate from pulmonary troubles was high. These conditions were illustrative of what then was true in other metal mining districts of the United States.

Today, the Bureau finds, the largest old mine fire area has been filled with slimes and the abandoned ore is now being mined. Virtually every mine now in operation has on the surface a large ventilating fan with fireproof setting arranged for quick reversal. Numerous fireproof fire doors have been installed. Coursing the air is practiced as in coal mines, and in one large group of mines every heading and raise is ventilated by an individual ventilating canvas tube. Hundreds of small fans have been placed for this purpose. The result is that the air in the working places has been so improved and the ground itself so cooled by the rapid ventilation that the miners can put in full working shifts without discomfort. At all mines now in operation water-injection drills and wet stopers have been put in or converted from dry stopers and the men have been generally educated to use water willingly in connection with drilling. While imperfections undoubtedly exist in the system and further improvements in drills are needed, wet drilling and stoping have been adopted in principle and in general practice. Watering the broken rock and ore is practiced, though in this practice and in the use of water sprays or water blasts, improvement may be made.

For fire protection, besides the fire doors introduced, some of the downcast shafts have been smooth lined with concrete slabs, which incidentally lessen air friction; other shafts have been gunited or coated with cement, and many of the shaft stations, small-fan installations, and ventilating-door frames have also been gunited. Water lines extend to all working places and there are numerous taps for fire fighting. Fire hose and extinguishers in some mines are kept ready for use at shaft stations; at other mines these are kept on the surface.

All the mines now active have fire-fighting organizations with men trained in the use of oxygen-breathing apparatus. At some of the individual mines this apparatus is kept ready for use. The largest mining company has two well-equipped central fire-fighting and rescue stations with firemen in constant attendance, and it has facilities for calling out over 100 trained men in any emergency. Over 500 men in the Butte mines have been trained in the use of self-contained oxygen-breathing apparatus, and many others have been trained in giving first-aid treatment.

The results of this review of safety and health conditions in the mines at Butte are given in Bulletin 257, copies of which may be obtained from the Bureau of Mines, Department of Commerce, Washington, D. C.

NORTHWEST MINING ASSOCIATION MEETS

(*Continued from page* 21)

spoke. His subject, in part, follows:

"Property owners should have enough faith in their properties to be willing that capitalists spend money in development without putting up large sums for bonds or purchase. He also said that the folly of expecting men without mining experience to be able to develop mining properties and the mistake of turning over to such men the money raised for development."

At the conclusion of the convention the following resolutions were adopted: Recommending a reduction in the corporation and license fees; classification of property for the purpose of taxation; opposing blue sky law going beyond filing of complete information; recommending an extension of the geological survey; recommending a department of mines for the State of Washington and completion of the college of mines building at the University of Washington, Seattle.

Resolutions were also adopted protesting against the issuance of grazing leases unless mining rights were reserved completely; protesting against the curtailment of mail service in Alaska and western states; recommending abolition of capital stock, corporation stock stamp and corporation license taxes; protesting against the extension of national parks except with mining rights reserved.

The convention adopted resolutions recommending the cession of federal lands to states in which the lands are situated; recommending that Alaska lands and resources be ceded to and controlled by Alaska, the same as is done in the Philippine Islands; protesting the discontinuance of the Alaska railroad; thanking British Columbia for its generous exhibit; the press, the merchants and others for their helpfulness.

The last evening a smoker was held in the Chamber of Commerce assembly hall, with more than 400 attending. Entertainers from the Davenport hotel and others providing dancing and music.

OXYGEN OIL EXPLOSIONS

AN investigation intended to determine the conditions under which compressed air or oxygen in contact with hydrocarbon and other oils may be subject to explosion hazards, and to devise means of safeguarding against such hazards, is being conducted at the Pittsburgh, Pa., experiment station of the Bureau of Mines. Since the publication of previous results, the explosibility temperatures for eleven additional substances have been determined in the 4-cc. test bomb using high-pressure oxygen. A number of experiments was also made using low-pressure oxygen, high-pressure air, and a mixture of oxygen and helium.

RESEARCH OF DETONATING SILVER COMPOUNDS

IN connection with the general study intended to develop new uses for silver, research work on detonating silver compounds has been undertaken by the Bureau of Mines. The silver salts that are considered to have explosive properties have been made and tested and their sensitiveness to heat and impact and their explosive strength determined. Experimental work has been conducted with silver azide, silver fulminate, the silver salts of some of the nitro-aromatic compounds and silver oxalate. Work has been completed on silver acetylide and the silver salt of trinitrohydroxyaminobenzene.

REPORT OF CARNEGIE INSTITUTE ON ROCK DUSTING

Professor Steidle Issues Report On Investigation And Survey Of The Use Of Rock Dusting In Coal Mines—Less Than Four Percent Of Coal Companies Now Using This Process, With Pennsylvania Leading

RAPID progress in the prevention of coal mine explosions and their resulting toll of death by developing the art of rock dusting during the past year is reported by Edward Steidle, supervisor of the Cooperative Coal Mining Courses at Carnegie Institute of Technology, in announcing the results recently of a survey of rock dusting methods. The study was made in connection with a program of research in coal mining problems that is being conducted this year in cooperation with the U. S. Bureau of Mines.

While only one company in America practiced rock dusting on a large scale prior to the year 1924, Professor Steidle's report points out, at present no less than 211 mines are now rock dusted. Although this number is approximately only 4 percent of the total number of bituminous coal mines in the United States, Professor Steidle's survey report suggests that the increase in the number of rock-dusted mines is significant of the desire of the coal mine operators to immediately adopt any practical method that will prevent explosions.

Of the 211 mines now rock dusted, Professor Steidle's report shows, 63 are in Pennsylvania, 20 in West Virginia, 8 in Alabama, 3 in Colorado, 21 in Illinois, 5 in Indiana, 2 in Kentucky, 13 in New Mexico, 3 in Ohio, 2 in Oklahoma, 21 in Utah, and 49 in Wyoming. A total of about 1,000 miles of entry have been dusted. Pennsylvania leads with about 400 miles and West Virginia has about 100 miles of dusted entries.

As the present and the coming months constitute the most dangerous season of the year for coal mine explosion hazards, the Carnegie expert predicts, in his report, that an even greater degree of progress in adopting rock-dusting methods will be recorded during the next six months.

"Although standard practices for rock dusting have already been adopted by the American Engineering Standards Committee in cooperation with the American Institute of Mining and Metallurgical Engineers, many mining men would consider it an endless task to follow the specifications in connection with an old mine," the report continues, in urging a wider adoption of rock dusting. "It must not be forgotten, however, that any amount of rock dust is of value and the specifications are meant to imply complete protection. The most important consideration is to make a start. About 85 percent of coal-dust explosions in America have initiated on narrow work, either along the haulage ways or at the faces of development workings. Dusting should start at the face and proceed toward the shaft or other openings, and preference should be given to the more gaseous section.

"The watering method was formerly considered the panacea for coal dust explosions. At first this method was properly enforced, but as time went on it was done in an ineffective manner. Rock dusting should not be allowed to follow the same trend or enforcement may dwindle to the same serious aspect. After all, rock dusting is simply an extra safety measure, and none of the old safety practices can be abused, because a mine has been rock dusted. Furthermore, systematic inspection and sampling and effective application of dust are absolutely necessary in the maintenance of a rock-dusted mine.

"The effective life of rock dust for haulage ways must be determined for each mine and obviously certain parts of haulage ways will become contaminated more quickly than others. The period ranges from three to six months, while in the case of the watering method, the period is from 24 to 49 hours, depending upon the season of the year."

"Although more than 200 coal mines have been rock dusted in this country it is significant to note that only about 38 rock-dust testing kits have been marketed. It is, no doubt, true that a few companies use home-made testing kits, but surely a large percentage of mines are being dusted without any attention being given to proper inspection, etc., which procedure is likely to result in unsafe conditions and improper and uneconomic application of dust.

"Entries in which no traveling or hauling is done may be protected by rock-dust barriers which should be of types as specified by the Bureau of Mines. The amount of dust used in barriers should be at least 100 pounds per square foot of average cross section of entry, at the barrier zone. Furthermore barriers should be constructed so that they will be operated from either direction by the advanced wave of an explosion and will remain in operation during a period of at least seven seconds. A great assortment of barriers are now in use, and the Bureau is at present carrying on tests at the Experimental Mine, Bruceton, Pa., preparatory to establishing a schedule of tests for permissible barriers.

"The cost of commercially pulverized rock dust delivered at the mine in sacks, and 60 to 80 percent through 200 mesh in fineness, ranges from $5.35 to $7.25 per ton. The cost of mining and pulverizing shale at the mine has varied from $2 to $5.50 a ton, the latter including all fixed and operating charges. Mine operators are urged to study the problems relating to crushing and pulverizing. An efficient, well-managed plant at the mine should reduce the cost of rock dust from $2 to $3 per ton. The cost of applying dust with mechanical distributors on a basis of three pounds per linear foot, and including all charges has ranged from 1.2 to 3.1 cents per linear foot. Hand dusting has cost from 3.4 to 4.9 cents per linear foot on the three-pound basis.

"In conclusion, mention may be made of bulletins 18 and 22, printed under the auspices of the Carnegie Institute of Technology, the Bureau of Mines, and the Advisory Board of Mine Operators and Engineers in Western Pennsylvania. Bulletin 18 contains about 200 pages, including 50 illustrations, and is entitled 'Methods and Costs of Rock-Dusting.' It covers a thorough investigation carried on during the college year of 1924-1925 by C. W. Owings, Bureau of Mines, and C. H. Dodge, Carnegie Institute of Technology. Bulletin 22, entitled The Determination of Free Silica in Rock Dusting Materials, covers an investigation carried on last year by G. H. Emery, Bureau of Mines, and R. DeChicchis, Carnegie Institute of Technology. This bulletin includes a chapter on 'Chemical Analysis of Rock-Dusting Material in the United States,' by W. A. Selvig, Bureau of Mines. Copies of each of these bulletins can be secured by writing Carnegie Institute of Technology, Pittsburgh, Pa.

Studies of health conditions of miners and industrial workers are being made by the U. S. Public Health Service. They cover tuberculosis among zinc miners in Western Missouri; lead poisoning in the pottery industry; ague among brass foundry workers, and physical conditions of 10,000 workers in the steel, gas, chemical, pottery, and foundry industries to compare their general physical condition.

REFORESTATION PROGRESS BY COAL MINING COMPANIES

Gradually Interest In Reforestation Is Becoming General Throughout The Mining Regions, With Both Large And Small Operators Joining In A Well Organized Movement To Meet Future Timber Requirements Of the Coal Industry

By NEWELL G. ALFORD *

MUCH is justly printed about rapidly declining timber reserves and the enormous requirements of coal mining, but meantime the coal companies have been showing an unadvertised and progressively active interests in the forecasted shortage. The work of protection and reforestation is hardly broad enough to be classed as general but there is sufficient serious endeavor by both large and small operators to indicate the approach of a general and well organized movement to meet the future timber requirements of the coal industry.

The United States Forest Service and the various state foresters are eager to serve the mining companies with actual planting or helpful plans and the coal companies will probably organize by either districts or states for the purpose of getting the most of this material assistance that they can.

The work of the coal companies differs and varies to include one or all of the following:

(1) Protection with fire patrols.
(2) Removal of dead undergrowth.
(3) Proper thinning out of the young second growth.
(4) Cutting of mature or diseased trees in the older growth.
(5) Fostering of natural reforestation.
(6) Artificial setting.
(7) Nursery planting and cultivation.

PENNSYLVANIA

Of the states that are fostering reforestation by coal companies, Pennsylvania, so far as is known, is doing considerably more toward providing for future supplies than any other.

In Pennsylvania this work is by no means confined to the large producers, but most of the development is on the larger properties. Among the companies at present doing the mose extensive work are, The Allegheny River Mining Company, Berwind-White Coal Mining Company, Bethlehem Mines Corporation, Clearfield Bituminous Coal Corporation, Rock Hill Coal and Iron Company, Wilmore Coal Company.

In the anthracite district there are seven or more concerns that have a definite plan for retimbering their boundaries. So far as is known, the most extensive work is being done by the Philadelphia and Reading Coal and Iron Company. In the fall of 1920 this concern organized a forestry bureau and now maintains a field force of 15 foresters and rangers with 30 woodsmen as assistants, who have opened and now maintain nearly 400 miles of roads and trails to make the forests more accessible for fire protection work.

The company has planted 918,000 forest trees to date and expects to add about 225,000 more in the spring of 1926. Trees planted have been exclusively two year old seedlings and largely of the pitch, jack, red and Scotch pine species. While the planting has been of considerable volume, the principal work of this forest bureau is fire protection. An idea of the necessity of such protection is given by the 831 fires that were fought on this property within the last four years that burned over an area of nearly 50,000 acres. The forestry bureau is self-supporting, in that it supplies to the company an average of about 1500 carloads of timber per annum. The trees cut are largely matured, the dead and defective timber being used mostly for mine lagging and props. Experience in this district shows that the cost for protection and development in a case like this one amounts to from 30c to 40c per acre per year. This company has a forester with unusual training and experience and it is his thought that where more than 25,000 acres of land are involved that the practical and technical nature of such work thoroughly justifies the services of a specialist.

On authority of United States Bureau of Mines, there are about nine board feet of timber used in the Anthracite district per ton of coal mined and the consumption has practically doubled within the past 18 years, while the unit price is four times as large.

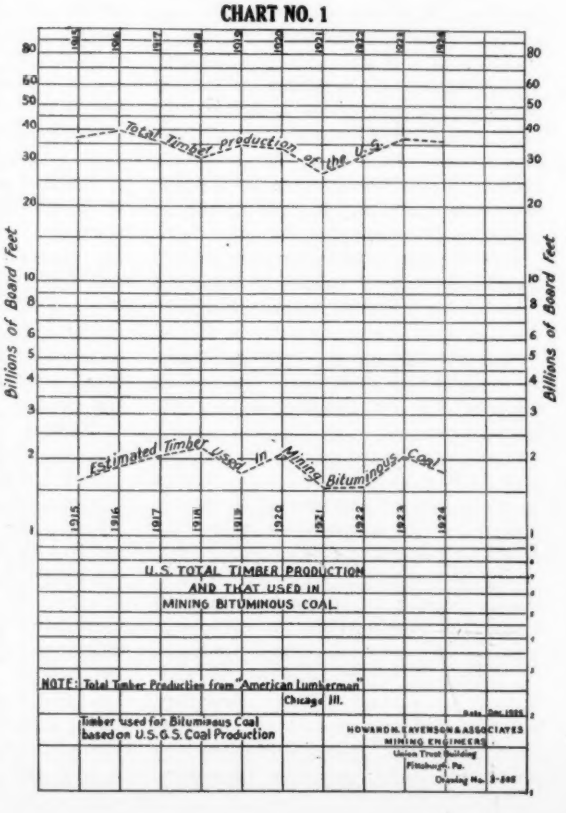
Over one million trees were planted with state aid in the spring of 1925; the work of the Wilmore Coal Company is perhaps on the largest scale. They have so far planted over 400,000 seedlings that have shown excellent progress. For the last two years they have secured two-year seedlings from the State Forestry Department that were mostly short leaf, Scotch, pitch and red pine, and Japanese and European larch. Next year they expect to continue with white pine and as much white ash as they can secure.

Because they believe that the ability of the state for distribution will be taxed by heavy demands in next year, this company is now preparing its own nursery so that eventually the company's forestry organization will be self-supporting so far as the seedling supply is concerned. It is expected that in possibly 15 to 25 years mine props will be cut from present planting.

So far the Wilmore Coal Company has not attempted the planting of hard woods and believes that these come from seed latent in the soil. They found in one case that a fine stand of white oak sprang up after the pine had been cut, indicating that the seed had been dormant in the soil for years.

The Bethlehem Mines Corporation began planting seedlings from the State

CHART NO. 1


Billions of Board Feet
Total Timber production of the U.S.
Estimated Timber used in Mining Bituminous Coal
1915 1916 1917 1918 1919 1920 1921 1922 1923 1924
U.S. TOTAL TIMBER PRODUCTION AND THAT USED IN MINING BITUMINOUS COAL.
NOTE: Total Timber Production from "American Lumberman" Chicago Ill.
Timber used for Bituminous Coal based on U.S.G.S. Coal Production
HOWARD N. EAVENSON & ASSOCIATES MINING ENGINEERS
Union Trust Building Pittsburgh, Pa.

*Consulting Engineer.
Paper presented to Coal Mining Institute of America, December 9, 1925.

Forestry Department in 1919, and to date have set out nearly 300,000 trees of this type.

The experience of this company has been confined to the red, pitch and jack pine, which have proven rapid growers with ability to obtain good growth on very indifferent soil. Pitch pine planted on one tract in 1919 has now attained a height of 15 feet and a diameter of five inches at one foot from the ground. The other species have done almost equally as well. Another phase of the work provides for the cutting out of dead chestnut and timber damaged by fire or disease. This cutting is under the supervision of a graduate forester who marks trees for elimination.

The Rochester and Pittsburgh Coal & Iron Company has planted 500,000 trees in barren places in the last three years. This organization believes in the conservation rather than the planting of hard woods. They utilize hardwood trees down to the small limbs which are turned into sprags, with a consequent minimum of waste. Cut over woods are allowed to develop a second growth of hardwood, and the experience of this company so far has been highly gratifying.

Ohio

In Ohio, the Carbondale Coal Company began reforestation of waste land in 1906, and each year since has planted an average of 10,000 seedlings of the pine species and they now have transplanted trees as large as 12 inches in diameter, one foot from the ground, and over 30 feet in height and based on the density of timber growth in that section, this company has found that in general it takes three acres of timber in the mining of one acre of coal.

In the Ohio coal fields there are three other concerns which have been definitely following a plan of reforestation under the guidance of the state forester at Wooster, Ohio, and while the work of the coal companies is not nearly so extensive as in Pennsylvania, there are now 10 reasonably large producers in Ohio who contemplate the starting of a definite program in timber work next year.

Table 1.—Timber Production In United States For All Purposes 1915-1924

	Board Feet
1915	37,011,656
1916	39,807,251
1917	35,831,239
1918	31,890,494
1919	34,552,076
1920	33,798,800
1921	26,960,864
1922	31,568,888
1923	37,165,505
1924	35,930,986

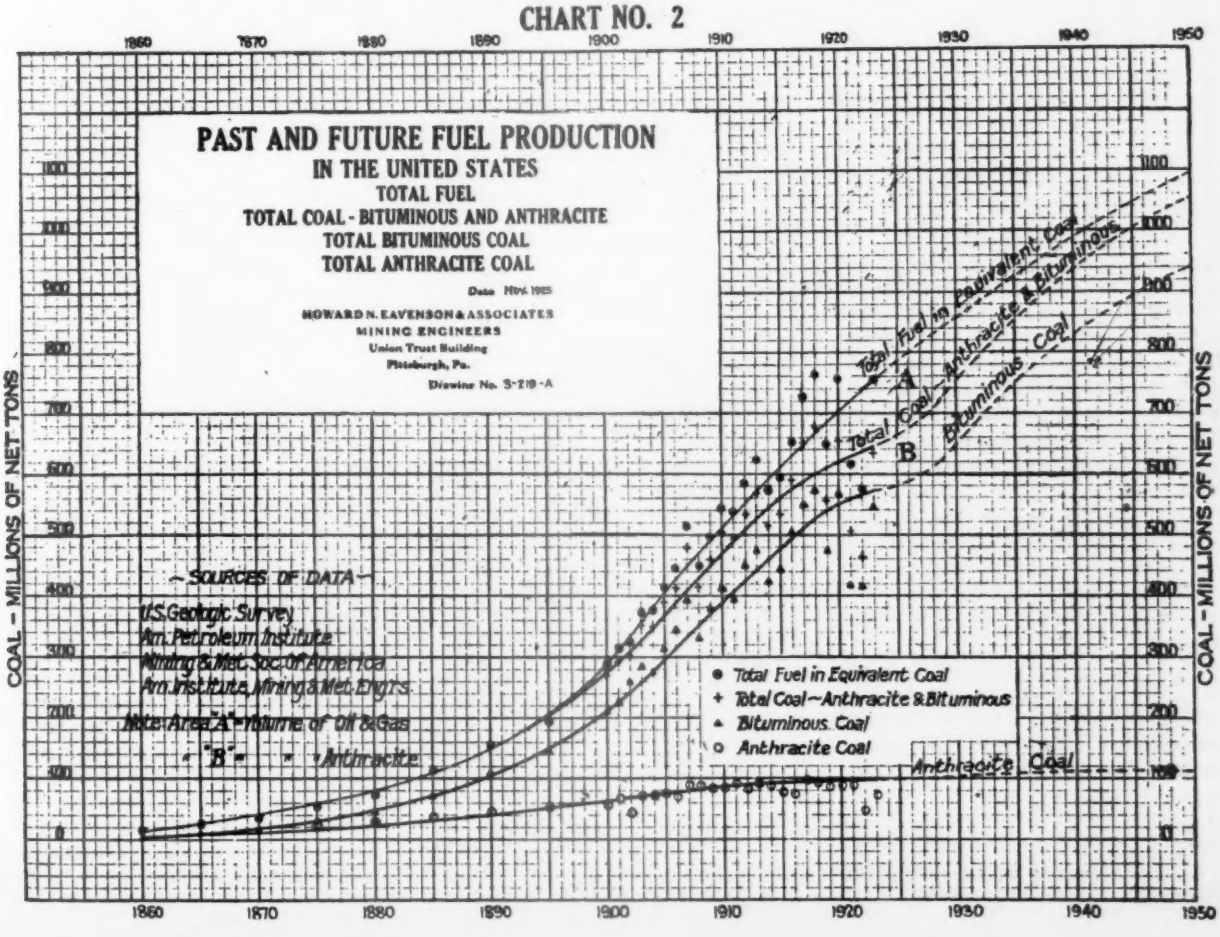
Supplied by the "American Lumberman," Manhattan Bldg., Chicago, Ill.

Indiana and Illinois

In Illinois and Indiana there is still a considerable supply of timber suitable for mine props in the southern parts of these states, with a large available supply coming from Missouri and Kentucky. With the curtailment of this supply in sight, several of the larger coal companies in Illinois have begun conservation work that consists of protecting standing timber against fire with fire guards and fire patrols, and stimulating natural production of standing growth with the thinning out of stands that are too thick among the young second growth, which is a large part of the present standing timber. They are also cutting such trees as have reached maturity in the older stands.

One of the three largest coal producers in Illinois has outlined a plan for reforesting land that involves the replanting of a definite acreage as wooded areas are cut off. They have cleared land unsuited for farming use, and say that the success of their program depends largely on their ability to protect their present standing trees.

In Southern Illinois large amounts of timber could be grown on worthless vacant land that is good for nothing else, and if the state had a more liberal



taxation policy for reforested lands, there is little doubt but that retimbering work would be promptly and actively started in the southern part of the State. In all of Illinois 76 percent of the total area is occupied with farming, and the balance consists of cities, waste and forest land and unimproved pasture. A much larger part of the cultivated land is in the central and northern part of the state. The Illinois Division of Natural History Survey estimates that the maximum areas which could be used for forest production is probably not over 5,000,000 acres, and that it would take the State one hundred years or more to reach a condition of self support in wood production.

Kentucky

One of the earliest pioneers in forest protection and the cultivation of timber was the St. Bernard Mining Company in western Kentucky, that was recently sold to another concern. In 1890 this company began the planting of seedlings on waste and vacant land from its own arboretum, and in 1920 they had the following amounts from artificial reforestation on several tracts embracing 550 acres:

1,310,000	Black walnuts,	ranging from 4 to 16 in. diam., 1 ft. above ground
230,000	Catalpas,	ranging from 5 to 10 in. diam., 1 ft. above ground
400,000	Black locusts,	ranging from 3 to 10 in. diam., 1 ft. above ground
30,000	Tulips (poplars),	ranging from 5 to 15 in. diam., 1 ft. above ground
Total 1,970,000	trees	ranging from 3 to 16 in. diam., 1 ft. above ground

In addition to this, the St. Bernard Mining Company in 1920 had approximately 30,000,000 board feet of natural growth on the stump on 10,000 acres of land, 12 inches in diameter and over, made up as follows:

20,000,000 bd. ft. White Oak
1,000,000 bd. ft. Hickory
4,000,000 bd. ft. Gum
5,000,000 bd. ft. Poplar

A few other concerns in western Kentucky have been interested in this work. The W. G. Duncan Coal Company have planted about 10,000 catalpa trees with satisfactory results, and have found that they can start a natural growth of walnuts by scattering the seeds through old fields.

In this section one of the greatest factors in reforestation has been the recent passing of a stock law covering Muhlenberg County, which it is expected will have a notable effect on young growth.

In this part of Kentucky old fields are showing a satisfactory second growth, although it is not usually of the most desirable species. Sweet gum, hickory and sycamore are predominating in these areas.

Other States

In West Virginia, where the largest coal producers are interested in forestry work, the activities have been confined largely to systematic forest fire protection.

In Virginia, the Clinchfield Coal Corporation and the Virginia Coal and Iron Company are likewise engaged in protective work. In the Alabama coal fields where mine timber is now none too plentiful, several of the large producers are likewise following a systematic plan for protecting the timber from fire, and in certain sections fire guards are cleared of all growth and burned off annually.

It is interesting that in Colorado an investigation has shown that to a large extent natural reforesting will take care of itself. The Colorado Fuel and Iron Company has found that by not cutting trees on the ridges and leaving a sufficient number below, that second growth is coming on in sufficient quantity to provide for the company's future needs.

Stripped Land

Contrary to the common belief when coal stripping became more prevalent, the waste lands from this method of mining are found to be very susceptible to the growing of trees. This has been demonstrated in Pennsylvania. On certain of these overturned areas in Indiana several thousand fruit trees have been planted, with the very surprising result that these trees are showing a much better performance than any neighboring orchards.

Generally, "the fundamental problem is to increase the production of timber by stopping forest devastation. About one-half of the timber left is in three Pacific Coast States and over 61 percent is west of the Great Plains. The annual new growth of timber is only one-fourth of the yearly consumption. The present cut of lumber in Pennsylvania is less than the amount used in the City of Pittsburgh alone. The production of yellow-pine is declining and within 10 years will probably not exceed the requirements of the Southern States themselves. Practically as much timber is destroyed annually in the United States as is produced for all uses." *

If the coal industry as a unit will actively join the growing movement for conserving our wood resources the taxing of embryo forests by states can be supplanted with legislation that in time will rewood much of the vacant space suitable only to the growth of trees.

Practically 3,046,000,000 board feet of timber are used annually in American mining and approximately 60 percent of this amount is used in producing bituminous coal.

Chart 1 shows that the amount of timber produced yearly in the United States from 1915 to 1924 for all purposes has been nearly uniform and that the demands of the bituminous coal mines in the same period were also fairly uniform. The reported total annual timber production for this period is given in *Table 1.*

Chart 2 † shows the past and expected future production of bituminous coal which is not submitted as a prophecy. It is based on the best data obtainable at this time.

Based on the extension for expected future bituminous coal production in *Chart 2* and using the estimated unit of 3.71† board feet of timber per ton of bituminous coal mined, *Chart 3* shows the expected increase in the use of timber for soft coal mining. It is expected that the true average timber consumption per ton of coal will be slightly higher rather than under this weighted average. The values as determined in *Chart 3* are shown in *Table 2.*

These figures are based on data obtained from the best sources now available.

Table 2.—1924 and Expected Probable Future Timber Used In Bituminous Coal Mining

	Board Feet
1924	1,788,200,000
1925	2,146,000,000
1926	2,176,000,000
1927	2,213,000,000
1928	2,264,000,000
1929	2,312,000,000
1930	2,405,000,000
1931	2,479,000,000
1932	2,553,000,000
1933	2,627,000,000

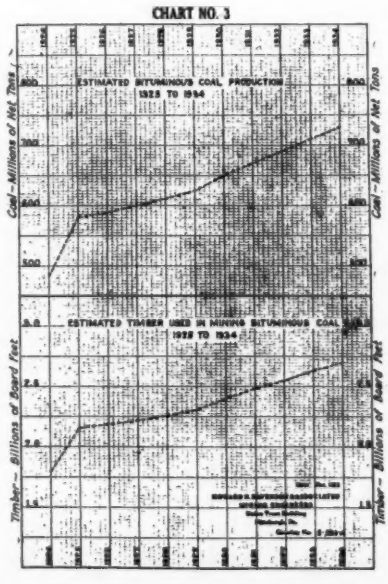


CHART NO. 3
ESTIMATED BITUMINOUS COAL PRODUCTION
1925 TO 1934
ESTIMATED TIMBER USED IN MINING BITUMINOUS COAL
1925 TO 1934
Coal—Millions of Net Tons
Timber—Billions of Board Feet

* United States Forest Service Report, "Timber Depletion," 1920.

† Trans. A. I. M. & M. E., Vol. LXX, p. 789, "Timber Used in Bituminous Coal Mining," by N. G. Alford.

PREVENTING TIMBER WASTE

Bureau Of Mines Issues Bulletin On Investigations Timber Situation In Coal And Metal Mines

IMPORTANT savings in the use of mine timber can be effected by careful selection, preparation, and storage of the timber, and by the treatment with wood preservatives of the timber to be placed in haulage-ways and other parts of the mine where untreated timber fails to give the desired life, states the Bureau of Mines. The Bureau recently completed a comprehensive survey of the mine-timber situation, which included underground studies of timber in the metal mines and coal mines of the country. Preventable waste of timber is going on in practically all mining districts, while the sources of timber are becoming more remote from the mines, and the timber more difficult to obtain, and more costly. In the selection of timber for mining use, ordinarily the most durable and strongest species obtainable locally are used, but in many mining districts depletion of the more durable species has compelled the mine operators to use less durable species or to ship in timber from other places.

The average life of untreated timber in mines throughout the country is only about 3 to 5 years. The damp, warm air of most mines is exceedingly favorable to decay. In very few of the mines studied by the Bureau of Mines were natural conditions found that were not conducive to rapid decay, except in places where the timber was either continually water-soaked or always dry. Decay is the relentless enemy of mine timber, and is the chief agency in its destruction. Sometimes insects do much damage to timbers, and in many mines breakage by crushing from pressure of the rock walls is important, but these agencies are usually assisted by decay. The wood-destroying fungi, or plants, that cause decay in mine timber are similar to those that cause rotting of wood above ground. Fungus flourishes most rapidly in wood that is damp but not saturated, between temperatures of 72 to 92 degrees Fahrenheit, although it is quite common in coal mines and metal mines where the temperature ranges as low as 50 degrees. The temperatures and humidity in mines are usually very favorable to fungus, so that it grows with amazing rapidity. It is a very common sight in undisturbed timbered places to see timbers literally covered with great masses of fluffy whitish balls, mushroom shapes, festoons, loops, pendant gossamer-like threads, and spreading mats of damp whitish tentacles. These growths throw off millions of tiny spores into the mine air, which are carried along by the air currents and settle everywhere, continually infecting new timber as it is brought into the mine. The actual decay is caused by the invisible thread-like roots of the fungus, which penetrate the wood, destroy its fiber, and sap its strength.

The most practicable method of combatting decay and thereby increasing the life of timber underground is to treat it with a good preservative before it is installed in the mine. The treatment poisons the wood so that fungus can not grow in it. Of the enormous total amount of timber used in mines, it is estimated that about 85 percent goes into temporary workings where short life does not matter. About 15 percent is used in haulage-ways, airways, and other more permanent openings where replacement from decay may be required. In some mine openings, timbers are replaced two or three times in a ten-year period, and where the opening is maintained 25 or 30 years or more, timbers may require renewal 5 to 10 times.

Preservative treatment of the timber to be placed in such openings, will prolong the life of the timber two to five times. Observations by the U. S. Forest Service, which cooperated with the Bureau of Mines in this study, have shown that treated timbers installed in a Pennsylvania coal mine 18 years ago are still practically all sound and evidently good for many years more. In this same mine untreated timber lasts only a few years. When the timber reaches the mine it should be used within a short time, or stored properly. At many mines, even large well-managed properties, timber is dumped at the most convenient points with no provision for adequate drainage and for circulation of air through the pile.

Information on the supply, consumption and costs of mine timber in various mining districts, the causes of destruction, methods of salvaging of timber for reuse, and the protection of mine timber against fire, is presented in Bulletin 235, entitled "Mine Timber, Its Selection, Storage, Treatment and Use," by R. R. Hornor and Harry E. Tufft. The bulletin also contains a chapter by Geo. M. Hunt, of the U. S. Forest Service, on methods of treating timber, and preservatives used. A copy may be obtained on application to the Bureau of Mines, Department of Commerce, Washington, D. C.

MAGNESITE IN CALIFORNIA

CALIFORNIA was for many years the sole domestic source of magnesite production in the United States, and still leads, although now joined in commercial output by the state of Washington. During the period of the World War, 1914-1918, and subsequently, the availability of American supplies became of vital importance; and California was not found wanting in doing her bit.

The commercial uses for magnesite are expanding and daily increasing in importance. The two main avenues in industry demanding this material are: refractory linings for metallurgical (steel and copper) furnaces, and oxychloride or Sorel cement work (flooring and stucco). For the former it is practically indispensable, and in the latter it possesses advantages over portland cement.

Before the war, nearly all the magnesite used for refractory purposes in the United States was imported. It was used as linings for basic steel furnaces and converters, and in other melting and heating furnaces in metallurgical works. The principal market for refractories was (and still is) in the eastern steel centers; and cheap foreign labor and low ocean freight rates gave foreign magnesite a commercial advantage over that produced in the west.

Because of the present increasing importance of the domestic magnesite industry and the active demand for data and information on California's resources, the State Mining Bureau, under direction of Lloyd L. Root, state mineralogist, has just issued a comprehensive and detailed report, entitled "Magnesite in California," as Bulletin No. 79, with Walter W. Bradley, deputy state mineralogist, as the author.

In addition to descriptions of the mines and plants, detailed information is given on properties, varieties, and uses of magnesite and its products; also specifications and testing for oxychloride cement mixtures.

Bulletin No. 79 is cloth bound, contains 147 pages, and is profusely illustrated with 62 half-tone plates and 11 line-cut drawings (including maps). It may be obtained for $1, postpaid, from the State Mining Bureau, Ferry Building, San Francisco, or from the following branch offices of the bureau: Chamber of Commerce Building (mail address, P. O. Box 1208), Sacramento; Pacific Finance Building (after January 1, 1926, Sun Finance Building), Los Angeles; Coalinga; Taft; Bakersfield; Santa Maria; Santa Paula.

PREPARATION OF BITUMINOUS COAL

When The Bituminous Coal Operator Markets His Product On The Same Basis That He Purchases Other Commodities Many Ills Of The Industry Will Disappear—Preparation Of Coal Is Key To Greater Profits

By WARREN R. ROBERTS*

THE vague and often erroneous ideas which the general public hold concerning the preparation of bituminous coal suggest that before discussing this subject we should state very clearly, and in language the public can understand, what should be included in the term "Preparation."

In the past producers and marketers of bituminous coal have referred to their product when sold in any other form than as run of mine as "prepared coal." Usually, however, the product thus referred to as having been "prepared" meant only that it had been sized or graded, and that the consumer could buy some particular size of coal instead of buying a run of mine product. The general use of the term "Preparation" therefore had a very broad and often misleading interpretation.

Since there is an increasing number of producers of bituminous coal who properly prepare their coal for market, we believe the time has arrived when there should be a very definite understanding both on the part of the producer and the consumer, as to just what will be included in the way of preparation when a product is advertised and sold as "prepared coal." We believe that such a definite specification covering this subject will be of equal importance both to the producer and the consumer. It certainly will be of great benefit to those producers who are already marketing a properly prepared coal, or who are making expenditures for this purpose.

A very simple and definite statement of a properly prepared coal is one which has been accurately sized, and secondly each and every size properly cleaned. That is to say, the refuse or free ash shall have been removed. Such a definition is adequate for the use of the general public. Large consumers of bituminous coal can supplement this specification by purchasing on an actual B. T. U. basis.

We believe that the practice of the anthracite industry in the preparation of their product could be adopted by the bituminous industry to the very great benefit not only of the producer but the consumer of this product. Anthracite coal has long been thoroughly prepared first by careful sizing followed by the proper cleaning of all sizes. The result of this practice has been that anthracite coal has had a wide spread of popularity throughout this country, and in Canada, which it seems to us should have long ago suggested to producers of bituminous coal that a similar preparation of their product would have made it much easier for them to compete with anthracite for at least a certain part of the trade where bituminous coal could be used to equal advantage if it were prepared equally well.

In verification of the above statement, we call your attention to the present market for bituminous coal in New England, and in other districts where anthracite had been largely used, but which cannot be obtained now due to cessation in production of anthracite.

We wish particularly to call attention to the fact that to obtain this former anthracite market, bituminous operators were required to prepare their product to meet the requirements of this particular market. Bituminous producers who were so fortunate or foresighted as to be equipped to furnish a product as required by this market, have obtained a merited reward.

Referring to our definition of "Preparation": it will be apparent that the sizing and grading only of coal, is only a partial preparation. It does not meet the practice as followed by the anthracite industry, or the practice in certain districts in the bituminous field where coal is both sized and cleaned.

There is doubt in the minds of many experienced bituminous producers as to the benefits to be derived from the sizing only of coal. During the past fifteen years we have heard this subject discussed many times by producers, especially in the Illinois and Indiana fields. These two states were pioneers in the practice of sizing coal, especially in the production of many different sizes. The wisdom of this practice was often questioned by some of the producers in these states who endeavored to improve conditions by reducing the number of grades or sizes made, and which had become more or less standard in these two states.

We believe that a great majority of the producers now in these states have learned from experience that a preparation consisting only of sizing is not wholly beneficial, and possibly is detrimental to the successful operation of their mines.

The present status of the industry in these two states, as compared with that of some other districts where sizing is accompanied by cleaning, would seem to indicate that there was more truth in the contention that sizing only was not sufficient preparation, than was realized in the past by those who considered sizing only an adequate preparation.

We do not maintain that the present misfortunes of this industry in Illinois and Indiana are entirely attributable to inadequate preparation, as this would not be true, but we do believe that it is a strong contributing factor.

Having defined what we consider Preparation for Bituminous Coal, and having illustrated this definition to make our position perfectly clear, we offer a few facts to support our belief.

Let us first compare the value of a prepared product with nature's product; namely, run of mine coal. There are two principal reasons why run of mine coal is not an economical fuel. In the first place there is no furnace which can burn run of mine coal economically, due to the fact that it is unsized, and therefore no furnace can be so built and so fired as to obtain full value from this product. Run of mine coal also necessarily contains whatever refuse the mine produced which could not be removed at the face, and anyone with experience in mining will admit that it is practical only to remove a portion of the refuse at the face, namely, the larger pieces. Therefore any consumer who purchases run of mine coal is paying for more or less refuse, depending entirely on the nature of the product as mined. He is therefore not only paying freight on a considerable amount of refuse, but is losing much in the economy of his furnace and handling an unnecessary amount of ash product. Lastly, he does not secure a uniform product which is essential for economy in burning any fuel. It should therefore be apparent, and we believe it is recognized by an increasing number of consumers, that run of mine coal is not an economical fuel for any purpose.

We will now consider the advisability of a consumer purchasing lump coal which is such a favorite with the domestic trade. We state it as a fact that the only possible reason for anyone buying lump coal instead of purchasing some particular size of coal, such as egg, nut, or pea to suit his furnace, is based on his experience that by buying lump

*President, Roberts and Schaefer Company, Chicago, Ill.

coal he was able to secure a cleaner product. Had the sizing of coal been accompanied by proper cleaning, we believe that the practice of domestic consumers buying lump coal in preference to these sizes would have long since ceased. Anyone knows that the purchaser of lump coal must break it up for use in the furnace. We can think of no reason why the domestic consumer would be willing to volunteer the amount of labor necessary to make run of mine coal out of his lumps unless it be that his experience had taught him that in this manner he obtained a cleaner product. We therefore maintain that if properly sized coal is also adequately cleaned, the custom of buying lump coal will vanish. In fact we think the day is not far distant when no lump coal will be marketed, as it is not an economical fuel for any use.

We have been discussing the economic reasons for an adequate preparation of bituminous coal, but we believe there are also questions of public policy which every industry must carefully consider, as such questions of policy have a very direct bearing on the prosperity of the industry. It is a well known fact that the bituminous coal industry has, for the past few years at least, been in anything but a prosperous condition. There doubtless have been several factors affecting the prosperity of this industry. We are interested at this time, however, in considering only the effect on the industry which the marketing of an inferior product produces. Just as sure as effect follows cause, so does the general practice of any industry ultimately affect its prosperity. In this particular instance, the result following the general practice of marketing a poor product has directly affected the price which could be obtained for the product.

It is an admitted fact that one of the chief factors contributing to the present unprofitable status of this industry is the inability of the producers and marketers of bituminous coal to obtain a price for their product which would even meet the cost of production to say nothing of showing a profit. We believe that the long established practice of this industry in marketing an inferior product has brought about this condition, and that the quickest and the surest method alleviating this condition is to remove the cause, and market a high grade article.

For many years the coal mining industry has been the object of constant and often bitter attacks from the public, through the press, governmental agencies, and otherwise. Out of all the discussion on this subject by the press and otherwise, we have failed to note mention of one of the chief grievances which the individual consumer of bituminous coal has constantly in mind, and that is, the quality of the fuel which he is compelled to purchase. We believe that this prejudice in the mind of the individual consumer against those who produce and market bituminous coal affects very materially the collective opinion and has been one of the chief causes for the wide spread unpopularity of this industry.

Our constant contact with coal operators enables us to state that there is an earnest desire on the part of at least the larger producers to regain the confidence and good will of the public. We believe this object could be attained if this industry would follow the good example of the railroads of the United States which during the past twenty years as is well known have by proper methods and practices changed their position in the opinion of the public from one of very great antagonism to that of a helpful cooperation.

We confidently believe that if the bituminous coal industry would prepare and sell such a product, as the consumer is justified in expecting he will receive, that one of the chief grievances which the general public has against this industry, would disappear.

We do not believe there is any other industry taken as a whole, that shows so little pride in the product it markets as the bituminous coal industry. Let us illustrate: This industry is a large consumer of steel products, copper products, machinery, etc., and in purchasing such commodities they require that these shall be produced and delivered up to certain standard specifications, and in fact, all such commodities are manufactured and marketed on the basis of carefully prepared specifications.

We believe that when the bituminous coal industry markets their product on the same basis that they buy other commodities, that this industry will rise from its present low estate to a place in the national esteem commensurate with the industry's magnitude and importance to the nation.

WASHABILITY OF WESTERN COALS

WORK is being continued at the Seattle experiment station of the Bureau of Mines, Department of Commerce, on the washability of fine coal on tables, with particular reference to Washington and Alaska coals. The purpose of this work is to obtain fundamental data on coal tabling, using the float-and-sink test of zonal products, supplemented by screen-sizing tests and chemical analyses. All experiments will be on commedcial-size tables. With these fundamental data in hand, it is proposed to attack the problem of cleaning fine sizes of Washington coals which have baffled all attempts to produce economically a washed coal of low ash content even though shown possible by float-and-sink tests.

That portion of the problem relating to the effect of specific gravity and size of particle on the distribution of coal and impurities on the table is practically completed. The information obtained proved an important step toward the ultimate solution of the problem of tabling bony coals. This work indicated the need of hydraulic classification of the feed. A single-cell coal classifier has been developed and given a thorough trial under widely varying conditions and has proved satisfactory. Appreciable improvement in the work of the table resulted from the use of a classified feed. During all the table tests, every variable has been carefully recorded, and some work has been done in correlating these data.

Particular attention will be given this coming year to a study of the table variables mentioned above, and to the perfection of a multiple-cell coal classifier along lines of the single-cell apparatus developed during the past year.

SPONTANEOUS COMBUSTION OF COALS

IN the course of a study of the spontaneous combustion of coal, being conducted by the Bureau of Mines at its Pittsburgh station, an adiabatic calorimeter has been constructed for the purpose of studying the heating tendencies of various coal samples under conditions permitting the elimination of all variable affecting spontaneous combustion save that of oxidation itself. The normal heating rate due to oxidation alone is then obtained. After once establishing this characteristic for a given coal other variables are introduced and their effects studied.

Characteristic normal heating rate curves have been established for coals of different ranks from lignite to anthracite. Except for the semi-bituminous coals and anthracite from a temperature of 40 degrees C. heating rates are proportional to the temperature; with semi-bituminous and anthracite the heating rates are practically constant. Variation in size of the coal under test does not affect the shape of characteristic heating curves. Heating, however, is very much intensified by reduction in size. Thoroughly dried coals heat less rapidly than those containing a little moisture. A moist coal will heat or cool depending on its degree of saturation relative to the air with which it comes in contact. With dry air and moist coal the latent heat of vaporization of the moisture taken to saturate the air may well be sufficient to overbalance the heat developed by oxidation.

NEWELL G. ALFORD APPOINTED ASSOCIATE EDITOR

Mining Congress Journal Announces The Appointment Of Mr. Alford As Associate Editor, In Charge Of The Practical Operating Men's Department, With Special Reference To The Coal Mining Industry—Interesting And Valuable Discussions Planned For The Year

IT IS with real pleasure that the MINING CONGRESS JOURNAL announces the affiliation of Newell G. Alford, of Howard N. Eavanson & Associates, as associate editor, in charge of the discussions which will appear under the Practical Operating Men's Department, devoted to a discussion of every-day coal mine problems.

In accepting the editorship of this department, Mr. Alford said:

"For some time the coal-mining industry has been trembling on the verge of a transformation (the nature and extent of the change can not be foreseen). Never has as huge an economic structure been so chilled and fevered by idleness and peak production.

"The Journal welcomes this opportunity to serve the operators of American coal mines in every way it can. This department will each month print articles designed for practical value to practical operating men.

"Each issue will have several discussions related to the same topic by writers whose experience will enable them to give real facts about the familiar problems at the mines.

"Some of the general topics that the Journal will handle in this department include various phases of practice in—

"1. Drilling and blasting.
"2. Roof control.
"3. Room and face conveyors.
"4. Mechanical loaders.
"5. Coal sizes and markets.
"6. Mine drainage.

"This department in the February number of the Journal will deal with coal-mine ventilation, and discussions have already been arranged on the following topics:

"1. Major problems in mine ventilation.
"2. Factors controlling choice of a fan.
"3. General mine ventilation.
"4. Why fans often cease to give satisfaction.
"5. Selecting the best type of fan drive.

"The Journal invites the coal operators to send special requests for the treatment of any particular questions in which they are immediately interested. Articles about inquiries of this kind will be secured promptly, allowing the Journal to increase the value of its service to the coal operators generally. If desired, the origin of such inquiries will be held in confidence."

Mr. Alford's background is principally a first-hand knowledge about the engineering and practical problems at the coal mines and a very successful experience in dealing with miners themselves.

Mr. Alford was born in Philadelphia, where he is still a member of Quaker meeting. He was educated in the Friends' School and graduated from Swarthmore College in 1909.

His college vacation work was in the engineering department of the United States Coal & Coke Co., at Gary, W. Va. Afterward he was with the St. Bernard Mining Co., at Earlington, Ky., until he joined Howard N. Eavenson in consulting work at Pittsburgh in 1920.

Newell G. Alford

In Kentucky his experience was unusually broad, giving him intimate knowledge of pay roll and billing work, mine surveying and inspection, construction, mine development, prospecting and supervision of operations. When he discontinued with the St. Bernard Mining Co., Mr. Alford was assistant to the president and chief engineer of that concern, which was then the largest operator in its district.

Since joining Mr. Eavenson his work has included reports on new development and revision to operating plants, various kinds of inspection and valuation work, and the prospecting of virgin lands. His work since going to Pittsburgh has taken him into the eastern and middle western coal mining states and New Mexico.

Since 1914 Mr. Alford has made numerous contributions to the coal mining and technical press and is now chairman of the Mining Section of the Engineers' Society of Western Pennsylvania, a member of the American Institute of Mining and Metallurgical Engineers, member and past vice-president of the Kentucky Mining Institute, member of the West Virginia Coal Mining Institute and of the Coal Mining Institute of America.

For the past two years Mr. Alford has served on the Coal Mining Branch of the Standardization Division of the American Mining Congress.

A study of the comparative composition of various coal tars is being conducted at the Pittsburgh, Pa., experiment station of the Bureau of Mines. The purpose is to apply analytical methods now practically standardized by the bureau to representative tars from various sources, obtaining thereby a uniform comparison of their composition and value. At present there are no reliable analytical data available which will serve as a basis for comparison and evaluation of coal tars, particularly low-temperature tars. Six tars were selected as representative of the best-known low-temperature carbonization methods employed in this country. These have been subjected to uniform methods of analysis developed in the Bureau of Mines laboratories, and the results compared with those obtained for a coke-oven tar and a water-gas tar.

A study of soot removal and prevention compounds is being made by the Bureau of Mines. In order to determine the effectiveness of such compounds for their stated purposes, a study is being made of the flue-gas temperatures and gas composition necessary for the reactions to take place both with and without the use of the compounds or other materials. The investigation will be extended to a study of the effectiveness of the compounds under conditions similar to those to which they are supposed to be applied.

The U. S. Bureau of Education says 50 night schools for coal miners were maintained in mining districts of Pennsylvania last year with the joint cooperation of the school of mines and metallurgy of Pennsylvania State College, the State department of public instruction, and the State department of mines.

COAL

PRACTICAL OPERATING MEN'S DEPARTMENT

Practical Operating Problems of the Coal Mining Industry

PNEUMATIC PROCESS FOR CLEANING COAL

Cleaning Coal By Air Divides Itself Into Four General Groups—Screening Fine Coal, Air Separation Of Various Sizes, Dust Control, And Elevating, Conveying And Distribution—Early Difficulties Now Overcome And Future Of Process Seems Assured

By RAY W. ARMS*

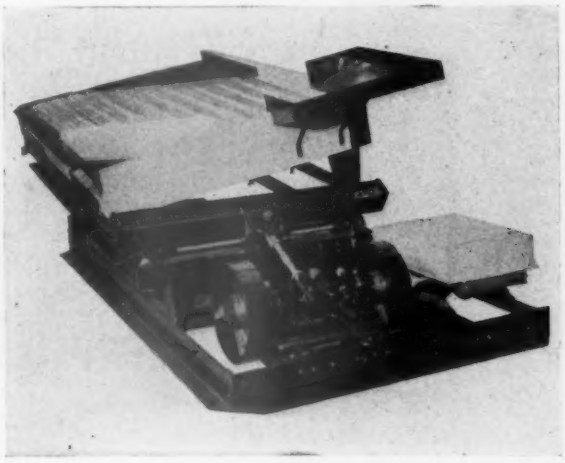
FOR centuries men have been endeavoring to harness the wind and conform its unruly temper to the accomplishment of some useful purpose.

Sometime during the history of this effort was discovered a significant fact—that air, in motion, has a selective or sorting power capable of blowing the chaff from the wheat or the dross from gold.

The development of machinery using this particular property of air was not important until the latter part of the nineteenth century when man's latent inventive sense began to manifest itself in all forms of labor-saving machinery. In all of the many and varied machines built for cleaning seeds, grains, ores, or gold sands in arid regions, the guiding principle was the same. This principle being established by nature is universal and infallible and possesses a definite potency and scope and also certain limitations.

All separating devices using air as a medium whether in the form of high or low pressure blasts, puffs, cross currents, carrying streams or retarding streams first create stratification of the materials and then by some mechanical means separate one stratum from another. Large pieces of a lighter material will report in the same stratum as smaller pieces of a heavier substance.

In order to get a pure substance completely separated from another, it is apparent the process must be limited to those sizes which air is capable of stratifying. This becomes an important consideration in coal cleaning, as some of the impurities are but little heavier than the coal itself.

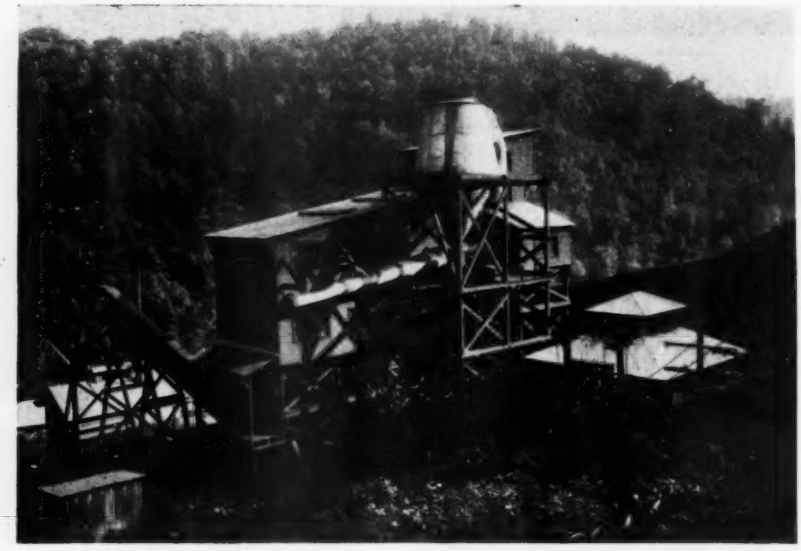


Arms Air Compressor

THE COAL PROBLEM

The problem of cleaning coal by air presented so many variables and uncertain elements, both of a technical and an economical nature, that there existed considerable disagreement as to the best method of applying the process to coal cleaning. It became necessary for pioneers to point the way by actual experience and as usual the pioneers were forthcoming, in the persons of the Sutton, Steele & Steele Company, who applied their air cleaning table and later redesigned it for the treatment of coal; the officials of the St. Louis, Rocky Mountain & Pacific Coal Company, who recognized its possibilities and with their own forces built the first commercialized plant; Col. Ed. O'Toole, who, realizing its possibilities, brought knowledge of the new application to eastern coal operators; the Roberts & Schaefer Company, who eagerly watched the early progress and entered actively into the development of the art

* Contracting Engineer, Roberts & Schaefer Company, Wrigley Bldg., Chicago, Ill.



Air Cleaning Plant, Covel, W. Va., Using Arms, Tables and Screens

in its broadest scope; Peale, Peacock & Kerr, who built cleaning plants of their own design for their own use; and the various coal companies who have invested their capital at some risk, including the American Coal Company of Allegany County, the Wyoming Coal Company and the West Canadian Collieries Company, Ltd.

The success of these pioneer plants was so gratifying that the Roberts and Schaefer Company entered upon a still broader scale of activity and bent its efforts towards the development of new devices to accomplish the various steps involved in the process. These steps naturally divided themselves into four general groups which had to be considered separately.

1. Screening of fine coal.
2. Air separation of the various sizes.
3. Control of dust.
4. Elevating, conveying and distribution of the various products.

Screening

The screening of fine coal is rather a complex problem owing to the many variables that affect the completeness or the speed at which fine screening can be accomplished. These variables include the capacity, the percentage of the various sizes to be separated, the percentage of moisture, the shape of the particles, and the friability of the coal.

Various forms of vibrating gravity screens have been devised in the past few years for the screening of fine materials and when the need arrived to screen fine coal in preparation for the air cleaning process these vibrating screens were adopted as being the best known device. They have achieved a very great measure of success but have been open to some objections which led the further development along this line.

First of all the cost of these screens per unit does not seem high when an individual screen will accomplish the desired purpose, but, when a great many of the screens are needed, the cost of the entire plant is high. Also due to the fact that they are set on a steep slope, when large numbers are used either in a tandem battery or otherwise an extremely high building is needed to house them.

It was discovered after a few plants were built that there was a distinct advantage in taking out the larger materials first, in order to reduce the breakage on these larger particles and also to supply to the screen having the highest capacity in tons per hour the greatest amount of material.

The solution offered for this problem is the Arms Horizontal Screen, which is set level or on a very slight slope. This screen by virtue of a short throw eccentric motion combined with an inclined discharge end support is capable of advancing the coal along a level surface and imparting to it a dancing effect which has proven to be highly effective in removing the undersize. As usually installed, two of these screens are attached to the same drive shaft in balance, the upper screen having a screen mesh of a larger aperture than the lower deck. These screens are installed in tandem sets with as many batteries as are required to handle the tonnage. By using balanced screens a large screen area of the finer mesh screens may be installed without requiring excessive floor space as each of the screens is provided with a fine mesh lower deck which screens out a portion of the fine undersize as it advances the coal to the succeeding screen.

It was found, after making several installations of this screen, that improvement was obtained in an unlooked for direction. The action of the coal on the screen is such that practically all of the fine undersize is taken out and therefore does not reach the cleaning tables to be blown in the air in the form of dust. This form of screen has therefore been of great sssistance in the control of dust in air cleaning plants as they themselves in spite of their agitation of the coal do not create dust in the atmosphere surrounding them. A slight suction below the screens is all that is required to control the dust.

Air Concentration

The need was felt for an air concentrator occupying the least possible floor space and constructed as simply as possible of materials best adapted to the severe uses to which this type of machinery is usually subjected. In designing this concentrator the requirements of plant design were also considered and the form and size of the concentrator were made to fit in with the elevating and conveying (*Continued on page* 44)

Wyoming Company Air Cleaning Plant

THE McCOMAS DRY CONCENTRATION PLANT

Largest Installation Of Kind In World—Has Prepared For Market More Than Half Million Tons—Total Annual Cost Including Overhead And Amortization 18½ Cents Per Net Ton—Friable Draw Slate And Fire Clay Completely Removed

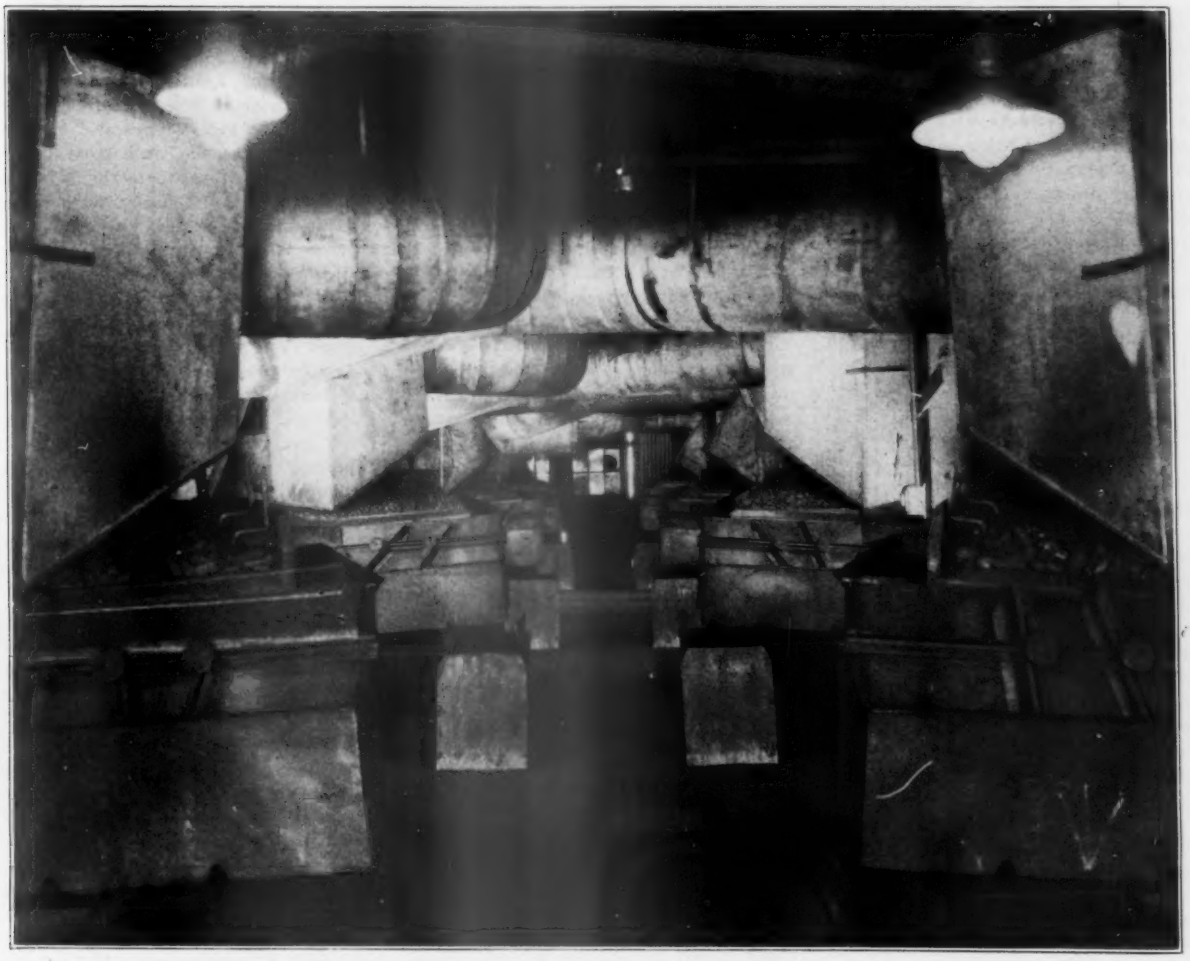
By H. D. SMITH *

THE pneumatic coal separating or dry concentration plant of the Crane Creek mine of the American Coal Company of Allegheny County, McComas, W. Va., is the largest installation of its kind in the world, and at the time of its erection was the first large scale plant. It has been in continuous operation since May, 1923, during which time it has prepared for market in excess of half a million tons of nut, pea and slack coal.

The mine operates in the Pocahontas No. 3 seam which at this point is tipple height. The coal itself is of a quality usual to this seam. The usual bands of bone coal are encountered. It carries a friable draw slate varying from one-half to two inches in thickness immediately above the coal, which comes down during the mining operation. In pillar work this draw slate crumbles readily, the greater portion passing a one-inch screen. Fire clay is also encountered at points, a portion of which gets into the coal during mining operations, as well as other foreign and deleterious matter, due to crumbling of the roof and bottom, and from falls.

The usual markets for this coal are, the inland domestic trade using the larger sizes of lump, egg, nut and pea; the Tidewater market using mine run for steam consisting of Navy requirements, New England market, bunkers and export; the inland market using mine run and slack for steam purposes and the inland market of two-inch, one-inch and half-inch slack for by-product coking purposes. The more desirable inland steam, New England, bunker, export and Navy trade require mine run coal of United States Navy standard specifications, which for Pocahontas coal is not to exceed: moisture (as received), 2.5 percent; ash (dry basis), 6.5 percent; sulphur 0.75 percent and volatile matter 22 percent. The more desirable inland slack trade requires coal meeting the by-product coking specifications of, moisture (as received), 5 percent; ash (dry basis), 7 percent; sulphur, 1 percent, and volatile matter, 20 percent. It is therefore manifestly advantageous to the mines of the Pocahontas Field to prepare the various sizes required by its markets, as evidence of which, approximately 95 percent of the

*General Superintendent, The American Coal Company.



McComas Cleaning Tables

production of this field outside of captive mines, originates at mines equipped to prepare domestic sizes.

After considerable investigation into every known process of coal preparation, lasting during a period of more than a year, it was determined that the American pneumatic coal separator was the only process which promised to meet the requirements. Accordingly it was decided that in order to come within the specifications there should be prepared in addition to the lump and egg sizes a 2″ x 1″ nut product for the domestic trade, and a 1″ slack product for the steam and by-product coke trade. To obtain this it was found necessary to treat on the separators the coal passing a 2″ screen and retained on a 1/16″ screen, and to allow to remain untreated the through 1/16″ product. The results anticipated have been realized, which is attested by the fact that 90 percent of the coal passing through the cleaning plant since its installation has been used for by-product purposes, where it has been preferred on account of its quality.

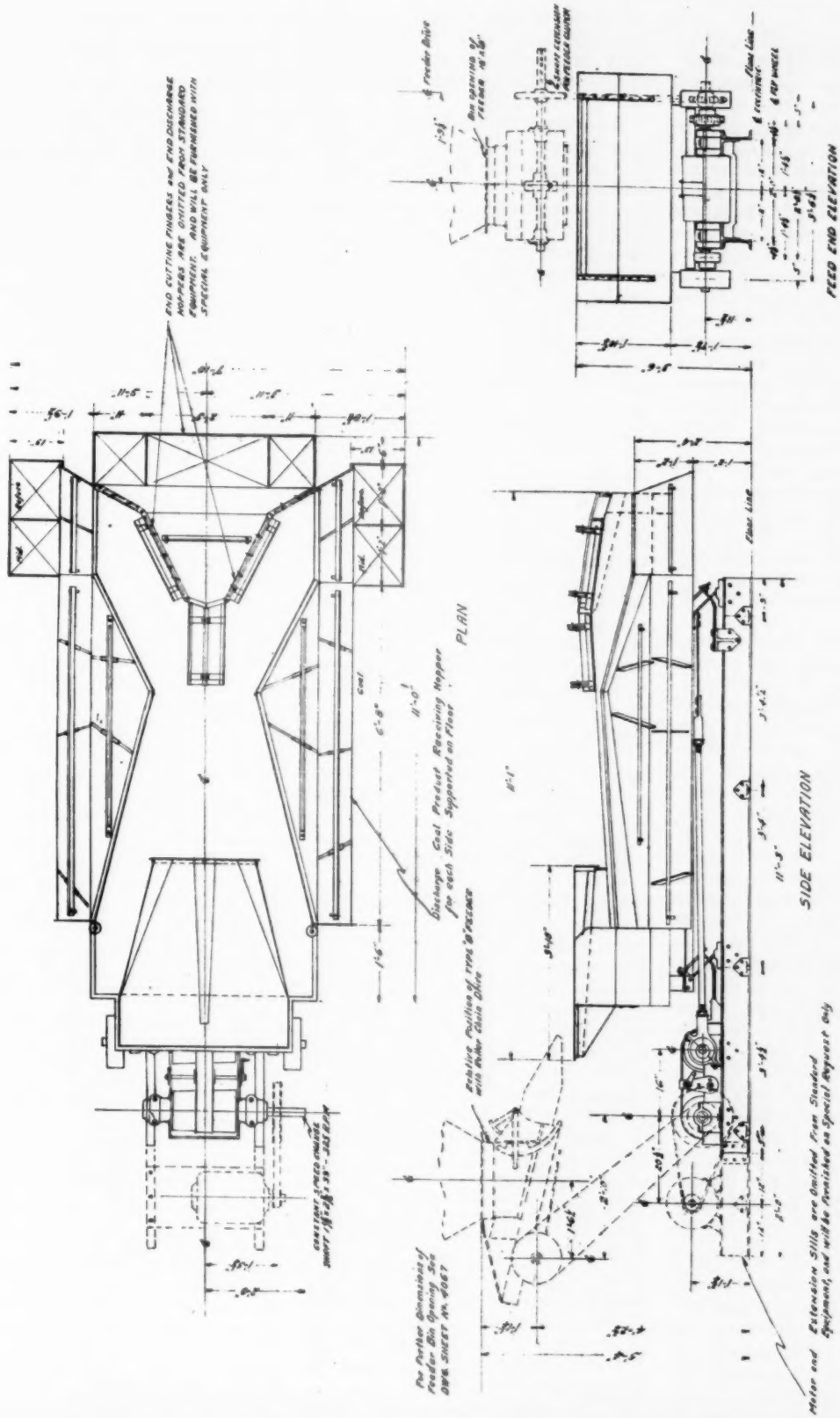
This plant was designed and installed by the Roberts & Schaefer Company of Chicago, Ill., and since the installation of this plant the American Coal Company have developed a market for their 1″ x ½″ pea coal, thus placing an increased percentage of the production in the higher price domestic trade. As the pneumatic separating plant was originally designed to prepare only two products—2″ x 1″ nut and 1″ slack—and as it was not possible to obtain a full recovery of pea coal through this arrangement, a portion of it being used to enrich the slack product, the problem of treating the fine size through a 1/16″ ton cap screen on a concentrating table to further reduce the ash in the final slack product was decided on and experiments were tried on cleaning the through 1/16″ product on one of the tables cleaning the ⅛″ to 1/16″ sizes. It was found that this through 1/16″ size could be cleaned and a considerable reduction in ash made. The American Coal Cleaning Corporation of Welch, W. Va., were requested to run experiments on the fine sizes of coal with their new type separator designated as the "Y" type concentrator designed primarily for the treatment of the finer sizes at an increased capacity over their first tables. This "Y" table was installed by the American Coal Cleaning Corporation and tests run for three months on the ⅛″ to 1/16″ size coal and the through 1/16″ size coal after running it through aspirators designed by the B. F. Sturtevant Company, who ran the test in conjunction with the American Coal Cleaning Corporation. The practibility of treating the ⅛″ x 1/16″ and the through 1/16″ sizes with this separator has since been conclusively demonstrated. It has been found that the quality of separation obtained with this unit is the same as with the older type at a capacity double that heretofore obtained. In treating the through 1/16″ product as one size, with 7 percent to 10 percent of the product removed in the form of dust, an average ash reduction of 34 percent was obtained during a test lasting 21 full days. Experiments were made in aspirating the dust from the through 1/16″ product. It has been the experience with the pneumatic separator that the efficiency of separation increases in direct proportion to the restriction of the range of sizing. As it is generally found to be impractical to size coal by the use of screens under 1/16″, without drying, the problem resolves itself into a question of the relative advantage resulting from the respective systems in relation to the cost of installation, the cost of operation and the increased efficiency obtained.

Dry Separating Table in use at the McComas Plant

After running tests with the ⅛″ x 1/16″ and through 1/16″ product on the "Y" table, a test was run over a considerable period on coal through a ⅛″ ton-cap screen, combining the ⅛″-1/16″ size with the 1/16″ to 0 size, after putting same through the B. F. Sturtevant aspirator. The aspirator pulled out material that would pass 85 percent through a 40 mesh screen. The aspirator is made adjustable so most any degree of aspiration can be made. This test on the ⅛″ to 40 mesh coal showed as good results as was obtained in treating this coal in two separate sizes, mainly ⅛″ to 1/16″ and 1/16″ to 40 mesh. The good results shown on this size was partly due to the fact it is very difficult to screen on the 1/16″ size due to varying moisture conditions in the raw coal from the mines.

At the present time in the Crane Creek plant the coal as it comes from the mine is fed directly to a Marcus shaker screen which separates it into 6″ lump, 3″ x 6″ egg and 3″ nut, pea and slack. The 3″ size and down is collected in a 90-ton storage bin directly under the shaker, from which it is transferred to the clean plant by an elevator having a capacity of 240 tons per hour. It is then screened into 3″ x 1½″, 1½″ x 1″, 1″ x ½″, ½″ x ¼″, ¼″ x ⅛″, ⅛″ x 1/16″ and through 1/16″ sizes by "Hummer" electric vibrating screens. The various sizes are conducted from the screens to small bins directly over the proper older type separators, of which there are eight, one each treating each of the above sizes, except the ¼″ x ⅛″, and the ⅛″ x 1/16″ sizes, which require two separators each. The coal is fed mechanically to each separator in a uniform stream, the clean coal, middlings and refuse products are being conducted by chutes to proper conveyors. The various grades of coal prepared are placed in their respective storage bins over the railway tracks, the middlings product is returned to the crude coal elevator, and the refuse is deposited with the pickings from the shaker screen on the refuse dump. The dust is collected from conveyors, screens, chutes and separators by Sturtevant cyclone collectors, and is at present shipped with the slack.

The cleaning problem at this mine, due to the character and composition of the crude product, and the extent to which the impurities break up into the fine sizes, is considered difficult. The 3″ nut, pea and slack coal as mined contains four products, that is, pure coal constituting approximately 83 percent of the total with an ash content of 4.30 percent; a low ash bone product, 5 percent of the total with 15 percent ash; a high ash bone product, 2 percent of the total with 30 percent ash, and a slate and fire clay product 10 percent of the total with 86 percent ash. The relative densities are under 1.35 specific gravity


END CUTTING FINGERS AT END DISCHARGE HOPPERS ARE OMITTED FROM STANDARD EQUIPMENT, AND WILL BE FURNISHED WITH SPECIAL EQUIPMENT ONLY
PLAN
SIDE ELEVATION
FEED END ELEVATION
Pneumatic Coal Separator "Y" Deck

for the pure coal, between 1.35 and 1.50 for the low ash bone coal, between 1.50 and 1.70 for the high ash bone, and over 1.70 for the slate and fire clay. The low and high ash bone products are predominant in sizes between 3" and ½", which accounts for the closeness of the sizing schedule of 3" x 1½", 1½" x 1", and 1" x ½", whereas in another installation where a higher density product predominates throughout this range of sizes, a combination into one size—2" x ¾" is found practical. The friable draw slate is predominant in the sizes under ½" and extends in considerable quantities to under 100 mesh. The product passing a 1/16" screen contains on an average of more than 11 percent ash. The bone coal which contains considerable fuel value is not entirely removed. The rejects or refuse constitute 8 percent of the crude product with an average ash content of over 80 percent. The loss of fuel value averages ½ percent of the coal treated. The coal as shipped contained on an average of 92 percent pure coal with an ash content of 4.3 percent, 5.5 percent low ash bone with 15 percent ash, 1.2 percent high ash bone with 30 percent ash and 1.5 percent slate and fire clay with 86 percent ash.

At the present time there is being installed an addition to this cleaning plant, which consists of five "Y" concentrating tables which will treat coal from ⅛" to 40 mesh in size, five B. F. Sturtevant aspirators for taking out of the through ⅛" size the dust below 40 mesh, five cyclone collectors for collecting the dust from the aspirators, a complete dust-collecting outfit to take the dust away from the "Y" tables during the cleaning process, also necessary elevators, bins and conveyors to bring the coal to the aspirators and tables and take away from the tables the clean coal to join with the clean coal from the main plant, the middlings to be returned and the refuse to the refuse bin for disposal on the dump. After completion coal from 3" to 40 mesh will be treated in this plant at the rate of 225 tons per hour on the tables with about 25 tons per hour of untreated minus 40 mesh coal.

The dry cleaning plant was put in operation in May, 1923. For the balance of the year, 1923, the running was intermittent due to many changes being necessary. Since January, 1924, up to the present time operation of this plant has been continuous. There has been run through the plant 230,411 tons during the year, 1924, and 290,087 tons up to December 1, 1925. This tonnage only represents what was lifted in the elevator from the main tipple and does not include the lump and egg sizes made on the Marcus screen.

As this dry cleaning plant was installed in an old washery building it was necessary to use more conveyors and elevators than would be necessary in a complete new plant, which made an extra investment, takes excess power and increased operating expenses above that in a new plant.

The following are the approximate costs per net ton at this plant on the coal going through the dry cleaner—basis, 1925:

Labor	.0222
Power	.0425
Repairs and supplies	.0050
Insurance and taxes	.0181
Depreciation—10% per annum	.0612
Interest at 6% per annum	.0367
Total	.1857

In the present plant there are eight tables operating on coal from 3" to 1/16". In the new addition which is now under construction there will be five "Y" tables to treat the ⅛" to 40 mesh size. There will be taken out of the old plant the two tables now cleaning the ⅛" to 1/16" size, also there will be taken out of the old plant four 8-ft. by 4-ft. Hummer vibrating screens, due to making one less size of coal than there is now being made.

It is felt by the management of this plant, after operating it continuously for the past two and one-half years and after operating wet washers that the dry concentration method of cleaning coal is practical, economical and cheap in comparison with other methods of cleaning.

Considerable investigating has been made relative to the drying of the slack coal from wet washers to a point where it would be acceptable by the by-product oven plants, and from information obtained it has been decided that it is possible to dry clean coal by the dry concentration method with about the same expense that would be necessary to dry wet washer coal dry enough for by-product use, without taking into consideration the cost of wet washing. In this we are referring to coal ranging in size from 1" down to dust.

This company now feels that it can endorse the dry concentration method of cleaning coal.

PNEUMATIC PROCESS FOR CLEANING COAL

(*Continued from page* 40)

machinery to the best possible advantage. The machine offered to fulfill these various needs is the Arms Air Concentrator. This concentrator follows the best modern practice of providing a reciprocating motion for the advancing of the material together with side and end slope for the purpose of skimming off the coal from the refuse.

Dust Collection

Soon after the first air cleaning plant was built and put into operation it began to be apparent that the collection of dust in a dry cleaning plant was to be one of the principal problems to be solved before the process was entirely successful. As a matter of fact it was thought by many that adequate collection of dust was impossible and that the machine should be entirely housed in and motors should be placed outside the building in order to be entirely safe. These ideas, however, have since been proven incorrect due to an entirely different point of view with regard to the collection of dust.

The first dust collecting systems attempted to remove the dust from the coal before it was passed through the cleaning process, thus cleaning a dustless material and eliminating the troubles from dust in this manner. It was found, however, that in the first place, it was impossible to remove all the dust from the coal feed in this manner and that the amount remaining still rendered the atmosphere too dusty for comfort or safety. It also became apparent that the abrasion of the coal subsequent to the dust removal was sufficient to produce a new burden of dust which was not removed by the collecting system.

The method of controlling dust now used, is to confine the machinery as much as possible to preventing dust from being circulated in the atmosphere, but where it is necessary to create a cloud of dust, to place over this source an adequate dust hood which will not only exhaust the air associated with the dust, but a sufficient surplus to insure that it is entirely removed.

Inasmuch as the principal source of dust is in the cleaning tables themselves where the air required for cleaning blows out any dust remaining in the sized coal, the largest volume of air to the dust collecting system is required at this point. The dust hoods as now provided for the cleaning tables are equipped with an adjustable door allowing a greater or less percentage of the air from the cleaning table to blow into the dust system and the remainder to blow directly to a confining hood which merely deflects the fine particles of coal, smaller than the size being treated but larger than dust particles, to the proper chutes or conveyors.

Elevating and Conveying

Little need be said about the machinery required for the transportation of the coal as these have followed the standards and forms long since established. The selection of the proper type, however, has been governed by the cost and by the adaptability of the various forms to the special requirements of this process.

PNEUMATIC COAL CLEANING AT GULF SMOKELESS COAL CO.

Coal Between 1/16-Inch And 2 Inches Particularly Adaptable To Dry Cleaning Process—Cost Of Power Found Important Item—Process Still In Early Stages And Undoubtedly Will Show Considerable Improvement As Development Continues

By W. P. TAMS, JR.*

PROBABLY the majority of coal operators are not fully familiar with the general theory of the air cleaning of coal. This may be briefly stated as follows: the impurity which it is desired to separate from the coal is of a greater specific gravity than the coal itself; therefore in passing the coal and its impurity in a thin sheet over a jigging table, it is possible to apply air through a number of holes in the surface of the table in such a manner that a multitude of air currents blow vertically upward against the coal and refuse which is being shaken over the table. The strength of these air currents is so regulated that they will be strong enough to blow the lighter coal up off of the heavier refuse, but not strong enough to lift the heavier refuse. The coal so lifted moves downward along the slope of the table and discharges from the bottom of the table. The heavier refuse is deflected by riffles, over which it will not pass, not being lifted by the air, and is guided by these riffles off of the side of the table travelling underneath the coal which is held suspended above it by the air currents. The refuse therefore discharges at a different point of the table, and in a separate mass from the coal.

This theory of the air table would operate perfectly and make perfect separation, only under perfect conditions, which would be as follows: If each piece of coal and each piece of refuse was of the same size, and all particles were perfect spheres, then with proper regulation of the air current and proper size of riffles, the separation would be 100 percent. Unfortunately, these conditions cannot be obtained. A flat piece of refuse will be floated over with the coal, while a cubical shaped piece of coal may be carried off with the refuse. Furthermore, it is not practicable to so size the crude coal that all pieces are uniform in size. The sizes handled must range, for example, from 1" to 1½". In such a range, air regulated to float the larger pieces of coal would be strong enough to carry with the coal the smaller pieces of slate. Generally speaking, the difficulties offered are the variation in size of coal that is necessary to be used on each table, the difference in shape of the particles of coal and of refuse, and the variations in specific gravity of some pieces of coal from other pieces of coal, and the difference in specific gravity of some sorts of refuse from other sorts.

In regard to the expense involved in using the air process for cleaning coal, this may be divided into four items. These items are; first, interest and depreciation on the first cost of the plant. The second item is cost of power needed to operate the plant. The third item of expense is labor to operate the plant. The fourth is the loss due to the refuse and coal which is removed from the crude coal treated. The interest and depreciation charge varies with the amount of coal handled and the number of sizes necessary to make. A cleaning plant to handle 150 tons per hour of nut and slack coal can be erected for about $75,000.00 to $100,000.00. The power required to operate such a plant will run from 200 kilowatts to 250 kilowatts of capacity. This power, of course, will not be continuously employed. The labor item is negligible, because one man, or at most, two men, can look after the entire plant. The cost, due to rejection of refuse, of course, varies with the amount of refuse removed. For example, if coal sells at $2 a ton loaded on cars, and if 4 percent of the coal is rejected by the cleaning process, obviously, 8 cents per ton has been lost. Generally speaking, the total cost of air cleaning will vary from 10 cents to 20 cents per ton.

The experience had with air cleaning plants seems to point to the following conclusions: It is not practicable, from a point of view of expense, to clean coal larger than 2 inches in size. Nor is it practicable to air clean coal smaller than 1/16 inch in size. To handle coal larger than 2 inches in size requires entirely too much power to furnish the necessary air. Coal smaller than 1/16 inch in size requires too many tables to handle any reasonable tonnage. The sizes between 1/16 inch and 2 inches can be cleaned by air, however, very successfully, and it is believed with less expense than wet washing. It is also believed that the efficiency of cleaning, between these sizes, is considerably greater by air than by the wet process.

The market conditions necessary to justify air cleaning of nut and slack appear to be that, first, the cleaned product can be sold when the uncleaned coal can not be moved; and, second, a sufficient additional price must be obtained for the cleaned coal to justify the total expense of cleaning. Usually the two reasons both exist, namely, ability to freely sell the cleaned coal, and also the possibility of a better price.

One of the best reasons for installing an air cleaning system would be the possibility of the local use of the refuse for the purpose of making power. It would seem perfectly feasible, by using that portion of the refuse which averaged 20 percent ash, to make the power used by the mine without any expense of fuel. This refuse could be powdered and readily used locally for making power, as powdered coal. Wherever this can be done, one of the main items of cost of air cleaning would be largely eliminated. Air cleaning of coal is in its infancy at present, and it may reasonably be expected that considerable improvement in the process is still possible.

The sizes between 1/16 and 2 inches can be cleaned by air very successfully, and, it is believed, with less expense than wet washing. It is also believed that the efficiency of cleaning, between these sizes, is considerably greater by air than by the wet process.

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* President, Gulf Smokeless Coal Company, Tams, W. Va.

DRY CLEANING COAL AT BRILLIANT MINE

This Company Was A Pioneer In Developing Cleaning Coal By Air, Building First Plant, And Doing A Great Amount Of Experimentation—Its Success Led To The Development And Installation Elsewhere Of The Pneumatic Process

By FRANK A. YOUNG *

A DESCRIPTION of the dry process coal cleaning plant which has been built and operated by St. Louis, Rocky Mountain & Pacific Company at their mine at Brilliant, New Mexico, should at first be a description of the special machinery which is used in this process. The equipment consists primarily of screens for sizing the coal into six different sizes, all smaller than 1½-inches and the pneumatic machines for cleaning each size. These machines are patented and are manufactured by Sutton, Steele & Steele, of Dallas, Texas, although all rights of sale have been acquired by the American Coal Cleaning Corporation.

It should be stated here that very accurate sizing is necessary for the success of the cleaning tables and that although the screens originally installed caused excellent sizing, they had not been sufficiently developed to be dependable for continuous operation. We, therefore, removed them and installed Hummer screens made by the W. S. Tyler Company. These are the four-foot, Type 31, single surface, 30-degree screens, and are set in two batteries of five each on a level floor with a small belt type bucket elevator feeding each screen. These elevators are encased in steel and have dust-tight spouts at top and bottom. At the discharge end of each there is a 6-inch dust pipe connection to the dust collecting mains.

These Hummer screens have given good results and no repairs have been required. Occasionally when the screening hopper at the tipple was not emptied at night, rain wet the coal and we had trouble on the screens. This can be avoided by cleaning out the tipple hopper after each run. However, it must be remembered that these screens will not handle wet coal.

The capacity of the plant with ten Hummer screens and twelve pneumatic tables is 80 tons per hour.

The basic principle of the pneumatic cleaning table is that if a film of coal one to two inches thick, and all of nearly the same size pieces is placed on a flat, perforated surface and a large volume of air passes through it, the lighter particles, which are the clean coal, will soon find their way to the top of the film, while the heavier particles, or waste, will remain on the bottom. The machine is built with a perforated deck about four feet square, under which is an air chamber and air duct connecting with a fan, which is part of the machine. The deck of the table has a reciprocating motion which tends to advance the product up a slight slope which is adjustable. The coal is fed at one corner of the table as shown, and the deck slopes also away from the feed at right angles to the recipracating motion. On top of the perforated deck are riffles about two inches apart and running parallel to the line of reciprocating motion. These riffles are about one-half inch high at the fan and feed side of the table and taper to nothing at the far side. When the coal is fed on to the table, the air through the perforations tends to raise it and roll it over these riffles down the slope towards the clean coal discharge. The heavier particles do not get over the riffles so rapidly, and the reciprocating motion is constantly pushing them toward the far side, which is the waste discharge. With these two forces constantly at work and tending in directions at right angles to each other, and the slopes in two directions being adjusted, there is in a few minutes a line formed between coal and the heavier particles near the side of the table opposite the fan. A splitter board is readily adjustable along the discharge side which deflects the coal into one spout and the waste into another. As this separation is very rapid there are always some particles which fail to arrive on time at their proper position. For this reason it is advisable to make a third product called "middlings," and this product is taken back and sent through the entire process for recleaning. As this process depends for its success on the difference of specific gravity between the coal and the impurity, it will of course work better when the impurity is slate or rock than when it is bone. There is, however, another important factor. Not only must the pieces treated be all the same size, but the same shape. A slate impurity is sometimes thin and flaky. These are hard to separate. At our Brilliant mine the impurity is nearly all slate, some of it in thin flakes. At our Koehler mine the impurity is mostly bone. This bone impurity breaks into pieces the same shape as the coal. In a test of a full day's run on Koehler coal we were surprised to find that the cleaning was even better than on Brilliant coal.

Now, as to the construction of the Brilliant plant: The Brilliant mine produces about 800 tons in eight hours. Our intention was to clean in this plant such coal as would pass through a 1½-inch bar screen. This appeared by test to be about 75 percent of the total output. It was known that these screenings would contain a considerable amount of thin flat pieces much larger than 1½-inches. Also from our tests at Dallas we decided it best to treat only 1-inch and smaller on the pneumatic tables. For these reasons it was decided to install two spiral separators for cleaning the larger sizes. The plant was planned to take the screenings direct from the tipple to the cleaning plant, and to return the cleaned coal to the tipple for mixing with the hand-picked lump to make a clean mine run or to sell the combined cleaned sizes as a stoker coal. In order to use a belt conveyor rather than an elevator for bringing the raw coal to the plant, the plant was placed 230 feet from the tipple. The different units and their arrangement in the plant may now be described as follows: A 30-inch belt conveyor 250 feet centers with a rise of 63 feet takes the raw coal from the tipple to the plant. This discharges into a revolving screen 5 feet diameter and 13 feet long. The upper 8 feet of this screen has 1-inch square perforations and the undersize drops into a 30-ton bin, which supplies the screens. The lower 5-foot section of the revolving screen has 1½-inch square perforations, and the undersize drops to a five-ton bin which supplies the right-hand spiral. The oversize goes to a five-ton bin which supplies the left-hand spiral. The discharge from these three bins is about 4 feet above the screen floor, which floor is 48 feet above the ground level. The screens are placed in two batteries of five each, 8 feet 3 inches apart center to center, and equidistance from the center line of the building. The No. 1 screens are each fed from the 30-ton bin by a reciprocating feeder the full width of the screen. These feeders as well as those for the cleaning tables, are a Sutton, Steele & Steele patent. They admit of accurate adjustment and are satisfactory in every way. The screen meshes are as follows: ¾", ½", ⅜", 3/16", and 1/16", the first two being square mesh and the other three ton-cap. The oversize from each screen is spouted to a steel pocket of about one-ton capacity, which is hung

*Mining Engineer, St. Louis, Rocky Mountain & Pacific Company, Raton, New Mexico.

from the bottom of the screen floor beams. These pockets are directly over and spaced exactly to suit the cleaning tables on the floor below. The coal from the two small bins is fed to the spirals by small shakers of the Parish type.

This is as good a time as any to discuss the spirals. Spirals for cleaning bituminous coal get a bad name. They are not satisfactory for all kinds of bituminous coal. Before adopting them we visited a large plant in Illinois where the results seemed to us very poor, and a small plant in Oklahoma where the results were very good. Much criticism is heard at Brilliant, largely, I think, because 25 percent of bright, clean coal of this size in the waste pile shows up very plainly, whereas at the wet washer the coal in the waste could only be known by analysis, and the same percentage would be considered an excellent waste. In spiral cleaning, as you know, the specific gravity of the materials has nothing to do with the results. It is the difference in coefficient of friction which makes the separation. Coal slides on steel chutes more rapidly than slate or bone and by centrifugal force is thrown over the side of the spiral chute into the outer collecting spiral. The slate traveling slowly stays in the inner spiral to the lower end which then becomes the waste chute. Remember that the material, particularly the waste, must slide and not roll. Therefore, if the impurities in any coal are inclined to be round or cubical in shape, they cannot be removed by spirals. At Brilliant the impurities are largely these flat pieces of slate. In every full day test we have made at Brilliant the spirals cleaned as well as the ¾-inch size pneumatic table. One full day's run on Koehler coal showed equally good results. We lately tried cleaning nut coal 3-inch to 1½-inch size from Sugarite mine. In this test the results were not good at all.

The waste from the spirals is conducted in chutes to a cross conveyor where combined with the other waste, it is taken to the waste pile. The clean coal discharge is so arranged that it can either be mixed with other sizes in the main clean coal bin, or diverted to a separate bin on the other side of the building from which it can be loaded into railroad cars as a pea coal.

Now to return to the screens: The last screen in each battery takes off the particles larger than 1/16-inch. At most mines it would not be worth while to screen or clean smaller than 1/16-inch, but at Brilliant this size contains more impurity than any other. It seemed to us easier to remove the dust from this last undersize by air than by screening. Sutton, Steele & Steele makes a machine for this which they call an aspirator. It consists of an enclosed chute 1-inch deep and 30-inches wide on a 50-degree slope which joins another vertical chute which has the same dimensions at the junction point but widened at top and bottom, the top being converted into a 10-inch circular pipe which leads to a suction fan and the bottom becoming a discharge. The coal is taken from the undersize delivery of the last screen by a small bucket elevator about 12 feet high and delivered through an enclosed spout to the aspirator. The fine coal thus joins the air current in a thin wide stream. The velocity of the air at this junction slot is about 7,000 feet per minute. Nearly all of the dust below 60-mesh is removed. The coarser particles from 60 mesh to 16 mesh drop into a pocket over the No. 6 cleaning table.

The pneumatic tables occupy the floor below the screen floor. They are placed in two batteries, right and left, under the steel pockets.

The same type feeder as for the screens, but only 12-inches wide, delivers the coal from the steel pockets to the tables. The reciprocating motion of the table operates at 350 strokes per minute but a pair of cone pulleys provides adjustment up or down of about 50 strokes per minute. The stroke is ⅝-inch. The fans operate at different speeds for each machine as follows: No. 1 Table 1,040 r. p. m.; No. 2, 1,040; No. 3, 1,540; No. 4, 1,000; No. 5, 1,000; and No. 6, 900. The clean coal drops directly into a storage bin occupying the next lower section of the building. The lower part of this bin is provided with gates and chutes for loading railroad cars alongside the building and on the under side with pipe outlets delivering to a belt conveyor which takes the clean coal back to the mine run car at the tipple. This conveyor must stop when the tipple stops, and when this occurs the pipe outlets soon fill up at the belt and stop automatically. The middlings from both batteries of tables are delivered to one belt conveyor which loads to a bucket elevator at the end of the building which discharges into the 20-ton storage bin. The waste from each battery of tables falls on a separate conveyor and these deliver to a cross conveyor which takes all the waste out of the building to the waste pile. This completes the description of the process except for the dust collecting apparatus. It was shown from the beginning that we would require such a unit, first for the operation of the aspirators and second to free the building from dust. The one installed is manufactured by Clark Dust Collecting Company of Chicago and is their design adopted to our needs. It consists primarily of a 60-inch Claridge fan placed between two collecting cones, or cyclones, as they are often called. The fan draws air through headers and branch pipes from the sources of dust, through the first cone, through the fan, and then forces it through the second cone discharging it to the atmosphere. The precipitation of dust is nearly perfect. The difficulty is to get the dust into the pipes. We tried to place dust hoods at all the points where dust was liberated. These hoods will not get much dust unless the air enters at high velocity. The area of hood opening must be no greater than its conductor pipe. The pipe branches to hoods were generally 7 inches diameter and the hood 30 inches wide. Therefore, the width of opening could only be about 1¼ inches. This hood opening 30 by 1¼ inches does not claim dust from a very wide area. We placed one hood at discharge of raw coal conveyor, one at each screen discharge and one large pipe to each aspirator. On the cleaning floor one hood at each cleaning table feed. The revolving screen had no dust hood and we soon found that it produced a great deal of dust. We partially enclosed it and placed a collector branch in one side of the housing. This helped some but the hoods do not get nearly all the dust. At the cleaning tables a worse condition exists. The hood at the feed collected considerable dust but the greater amount was liberated after the coal spread out on the table. To collect this is very difficult—perhaps impossible. Coming up through the table deck is about 6,000 cubic feet of air per minute. Even a 9-inch pipe and hood would then take only about 1,500 cubic feet. The cleaning table floor is a dusty place.

The application of power was planned as follows. On the screen room floor a 50 h. p. motor was placed which drove a line shaft across the building on the revolving screen floor level. From this line shaft belts were run to the raw coal conveyor, the revolving screen, and the middlings elevator. On the cleaning table floor a 100 h. p. motor was placed driving a line shaft on one side of the building and from this to a similar shaft on the opposite side of the building. These shafts drove by belts direct to the table fans and through countershafts to table eccentric shafts, conveyors, and feeders. Separate motors drive the dust collector fans.

The conveyor galleries and the main building are constructed all of steel with corrugated iron covering and steel sash windows. A steam plant outside the building furnishes steam heat. The electric wiring is all in conduit with dust-proof light sockets. From all this it might seem that the plant would work smoothly and without difficulty. Not so. There were difficulties. The dust was unpleasant and perhaps dangerous. Not only that, it stuck to the belts and pulleys and caused them to slip. Making the belts very (*Continued on page* 50)

DRY CLEANING PLANT OF THE GREENHILL MINE, WEST CANADIAN COLLIERIES, LIMITED*

This Plant Has Been In Operation For More Than Six Months And Has Given Even More Satisfactory Results Than Was Anticipated—Carefully Planned To Meet Local Conditions, It Operates With A High Degree of Economy

By G. A. VISSAC†

IN this paper we intend to deal particularly with the economic side of coal washing as it applies to our mines. We will then discuss why the dry-cleaning process has been selected, and give a brief description of our plant, dwelling only on its specific features and referring the reader to the numerous papers published on the subject for any details on the principles and machinery used in dry cleaning.

ECONOMIC DISCUSSION

The washery introduces an extra cost for depreciation, operation and loss in treatment. A certain proportion of the coal, now being sold and which the miners have been paid for, will have to be wasted. As a whole, the total increase in cost would be approximately 60 cents per ton. On the possibility of recovering this amount depends the success of the washery.

There are two advantages to be expected from the washery, the first, which occurs at the mine and which will be certain; the second, more difficult to estimate, because it depends upon convincing our customers that they should pay more for a better product.

The advantages at the mine are numerous. Portions of mines and occasionally entire mines are abandoned because the ash content of the coal suddenly increases beyond the limit acceptable to customers, and as there is no possibility of reducing the ash without a washery, this abandonment of workings results in serious loss which may impair the capital resources of the company. These conditions are evident in the Blairmore district, where coal-seams are very irregular. Seams 12 to 16 feet in thickness may contain 6 to 4 feet of coal high in ash, leaving only 6 to 10 feet of workable coal, with consequent increased mining cost and waste of property.

Assuming that the coal is selling at $5 at the mine, a freight and delivery charge of $6 brings the total cost to $11, and if the coal is improved 10 per cent by washing, its value to the customer should be $11, plus $1.10, or $12.10. The $1.10 can properly be charged to washery operation, but the customer must be interested in securing a better fuel and the mine can not be expected to reap all the benefit of the operation. However, it does seem fair that the consumer should absorb the major portion of the increased cost, and in the experience of the Blairmore district a difference of 50 cents a ton is commonly allowed between two coals of different ash content. This is a factor, however, that can not be entirely controlled by the mine.

The largest item in the cost of washing is connected with the quantity of refuse made in washing coal for various customers, and is regulated in accordance with the requirements of the purchaser. There are, however, a number of customers, particularly in Manitoba, who require a guaranteed ash content so low that very few Canadian mines can supply their requirements.

In considering our washing program the following data will be interesting: The coals of our district contain from 13 to 18 percent of ash, or an average of 15 percent. The crude coals now washed in West Virginia contain from 9 to 14 percent in ash. Our freight rates are: to Winnipeg, $5.10; to Regina, $3.70; to Brandon, $4.70; to Calgary, $2; to Vancouver, $5; to Spokane, $3.15; and to Seattle, $4.84. There is also a duty of 53 cents per ton on most of the coal going to the United States.

PREPARATORY STUDIES

Coal.—We have been studying our Greenhill coal for over three years by taking daily samples, establishing the average proportions of the different sizes, the nature of the impurities, and their relative specific gravity; with the result that we have been able to gather valuable data for the selection of sizes that may be produced by our washery and to ascertain the losses in the refuse corresponding to a specific reduction in the ash content. The refuse was separated by the "float and sink" method, in a liquid of 1.5 density. With a 10 percent loss in weight we find that the B.T.U. increases 10 percent.

These results were obtained on No. 1 seam, the only one worked at present. With No. 2 seam the impurities are of a more chemical than physical nature, and the results are not yet encouraging, but we expect that in the future we may avail ourselves of this coal by the use of the washery. This will prove very interesting to us, as we have large quantities of coal developed in the No. 2 seam. Another basis of estimation was the result of a test made at Welch, W. Va., on 30 tons of our coal, at the dry-cleaning experimental plant. These results were as follows:

Size—Inch	Proportion in weight Percent.	Ash content— Crude Coal Percent.	Clean Coal Percent.	Loss Percent.
Under 1/8	19	16.5	not cleaned	
1/8 to 1/4	9	17.5	10	
1/4 to 1/2	16	17.5	10	
1/2 to 3/4	14.5	17	10	
3/4 to 1	7.5	16	9	
1 to 1 5/8	8	14	8	
Over 1 5/8	26	12	not cleaned	
	100	15.41	11.68	6

With a total loss of 6 percent the ash content was reduced from 15.41 to 11.68 percent, the B.T.U. increased from 12,400 to 13,300, with only 55 percent of the crude coal being treated. Other tests show, in an extreme case, ash reduction from 17.82 to 12.80 percent, with a loss of 12 percent, when treating 55 percent of the crude coal.

Type of washery.—A number of the different types of washeries now on the market were considered. The wet-washeries by jigs or tables, or the Rheolaveur, did not offer us a wide enough margin of products. We consider that in our climate sizes from 3/4 to 2-inch (i. e., 20 to 25 percent of our product) are the only ones which can be treated, because it is possible to drain these before shipment, the drainage of smaller sizes being too difficult and expensive. The water problem was also a difficult one, because, though it is possible to use the same water over again, a change of water must be made at least every two weeks, and the foul water can not be disposed of in our streams, under the regulations of the Department of Agriculture. The flotation process also offered us too small a margin of products. In order to use that system the coal must be crushed finer than 200 mesh, and the washed products are not easy to market. Incidentally, the cost of operation of the flotation process seemed to us prohibitive.

The dry process of washing, therefore, appeared to us best suited to our conditions at Blairmore. This process will treat sizes from 1/32 to 2½ inches, which represents 80 percent of our coal. The only difficulty met with in the dry process is due to the presence of wet coal sometimes produced in the mines, which

*Paper presented before Canadian Institute of Mining and Metallurgy.

†General Manager, West Canadian Collieries, Limited, Blairmore, Alta.

difficulty, in our case, can be easily eliminated.

For a while it appeared to us that the dry process had not passed the experimental stage, but when, last spring, we saw the latest improvements at McComas and Wyco, in West Virginia, we became convinced that the process had been established on a successful and practical basis.

Outline of Greenhill dry-washery.—The ratio in the air being two and the hourly capacity of the large tables being from 15 tons of coal for the small sizes to 40 tons for the large sizes, we had to determine the number of tables necessary, and the sizes that each table should treat. Careful sampling furnished us all the necessary data to solve this question.

In our opinion the tables do not work as satisfactorily on the smallest and largest sizes as they do on the intermediate sizes, so we decided that the treatment of coal sized from ⅛ to 1⅝ inches would suffice for the present. Allowance has been made in our building for the treatment of two or more sizes if found necessary in the future. Our scale of treatment has been selected for the present as follows:

Total tonnage from the mine, 200 tons per hour:

Size Inch	Percentage of weight	Tons per hour
Under ⅛	19	not treated
⅛ to ¼	9	18
¼ to 7/16	12	24
7/16 to ¾	15	30
¾ to 1⅝	19	38
Over 1⅝	26	not treated

A total of 110 tons treated per hour.

We have been guided also in our scheme of treatment by the necessity of making sizes now accepted by the trade, or affected by special duties or freight rates. The sizes under ⅛-inch will not be considered for the present. The sizes over 1⅝-inch will be hand-picked. The improvement obtained by cleaning 81 percent of our product is considered sufficient for the time being.

The Greenhill Dry-Washery

General principles.—We have tried to design a washery of general layout to meet the following necessary conditions:

1. As few conveyors as possible: Our plant will have only three belt-conveyors and one elevator.

2. Providing the washery with a steady supply of coal: A bin of 110-ton capacity, representing one hour's run, has been installed at the head of the washery.

3. To make the layout as simple as possible: All operations are mechanical, a minimum only of labor is required.

General layout.—The coal is dumped from the pit cars into a bin of 15-ton capacity, which feeds a conveyor-belt 36 inches wide—this belt delivers the coal to a gravity screen which produces two sizes, over 3-inch and under. The coal over 3-inch is delivered to a belt on which it is hand-picked; the coal under 3-inch is delivered to two shaker screens. It is possible to feed both screens at the same time, or one only if necessary. Each screen produces two sizes: over 1⅝-inch, which is hand-picked on the screen, and under 1⅝-inch, which is delivered to the raw-coal belt, 36 inches wide, feeding the washery.

Plant of the West Canadian Collieries Company

The raw-coal belt delivers the coal into a bin of 110-ton capacity. From the bottom of this bin a bucket-elevator delivers the coal to the top of the washery, where a battery of Hum-mer screens separate it into different sizes, which are delivered to small bins set over the air-tables. There are five, type 37, Hummer screens, as follows:

One screen 4 feet wide for ¾-inch screening.

One screen 4 feet wide for 7/16-inch screening.

Two screens 8 feet wide for ¼-inch screening.

One screen 8 feet wide for ⅛-inch screening.

The washery contains four air-tables corresponding to the four sizes of feed enumerated above. Each table makes three products: Refuse, which falls into a bin situated under the washery; middlings, which are delivered to the raw-coal belt coming from the tipple and thus return to the feed; and clean coal, which may be delivered to bins in the washery, or to one of two belts that return to the different bins of the tipple.

The two returning belts to the tipple are 36 inches and 24 inches wide, respectively. Under the tipple there are 6 loading bins of 30 to 40 tons capacity each.

One bin for local delivery.

One bin for boilers' use.

One bin for mine-run.

One for the slack under ¾-inch or under 1⅝-inch.

One for the screen coal.

One for the lump coal.

The conveyor-belts from the washery, and the different tables and screens of the tipple are arranged to deliver to these bins according to demand. The coal under ⅛-inch, which is not treated, and the coal from the dust-collector may be delivered to both returning belts from the washery.

When, for instance, mine-run is required, the coal from the picking belts, the shaker screens, the tables, the undersize and from the dust-collector, is delivered to the main returning belt, thus insuring a thorough remixing of the coal. The refuse will be loaded from its bin into trucks and disposed of around the tipple.

Estimated costs.—The total cost of this plant will be in the neighborhood of $150,000. The total power required will be 180 k.v.a. The labor required will not exceed three men in the washery and two men for handling the refuse. The operating cost, which is possible to estimate, will then be as follows:

Power, 180 k. v. a. hours per 180 tons of clean coal shipped, at 1 cent per k. w. h. equals 1 cent per ton.

Labor, five men at $6.50 equals $32.50 for 1,440 tons in eight hours, making 2.2 cents per ton.

Interest on investment, $10,000 per year, or 3 cents per ton.

Depreciation, $15,000 per year on 300,000 tons, making 5 cents per ton.

Repairs, 20 percent of depreciation, or 1 cent per ton.

A safe estimate of total operating cost will be 13 cents per ton. To this must be added, of course, the losses in coal and refuse which, however, cannot be properly estimated at the present time.

Conclusion

We think we have selected the type of washery best adapted to our conditions, one that will minimize losses in coal for a given ash reduction, easy of control and operation, requiring a minimum of labor, reducing instead of increasing moisture, and capable of being operated the year round. We hope to accomplish with this washery some progress in the coal-mining industry. We will avoid the freight charges involved in carrying unnecessary ash—we will save in the handling of coal—decrease the probability of clinkering and be enabled to work coal seams hitherto deemed too high in ash to operate successfully. All of these factors, we expect, will not only pay for the extra cost involved but will enable us to give a better product to our customers. If we do succeed in our aim, we have no doubt that most of the bituminous mines in this district will find it desirable to follow our example.

This district produces some 2,000,000 tons of coal yearly. If ash to the extent of 10 percent were eliminated before shipment of the coal, a gain of 200,000 tons yearly in carrying capacity would be affected. Assuming that one car carrying 40 tons of coal is under load for 20 days and the season for coal production is 200 days, we find that some 500 cars less per season would be required to take care of this trade.

At the last annual meeting of the American Mining Congress it was stated that the United States was the country of cheapest coal production, and this was one of the main reasons for its prosperity. We have no doubt that anything we can do in that direction will mean for us not only wider markets and steadier work, but greater industrial prosperity for Canada.

The Greenhill dry-cleaning plant has been designed and erected by the Roberts & Schaefer Co. of Chicago. The cleaning tables are made by the American Coal Cleaning Corporation of Welch, W. Va. The Hum-mer screens are from the Tyler Company of Cleveland. The dust-collector is from the Sturtevant Company, Galt, Ont. The remainder of the machinery, such as elevators, conveyors, shakers, screens, pulleys, etc., were made by the Blairmore Iron Works of Blairmore, Alberta. Our plant has been in operation now for the last six months and has given us the most satisfactory results; as a matter of fact, we obtained even more than was expected.

Less fuel was consumed in 1925 by railroads in proportion to the amount of freight traffic handled than ever before, there having been an average for the first 10 months of 13 pounds used to move 1,000 gross tons of freight and equipment one mile compared with 148 pounds in 1924, and 160 pounds in 1923.

DRY CLEANING COAL AT BRILLIANT MINE

(*Continued from page* 47)

tight caused great friction on the line shafts and nearly doubled the power required. You will note that the drives to the fans are not very good—nearly vertical and short centers. The main drive from motor is not much better. Not realizing at first this great loss of power from friction caused by tight belts, we put in another 100 h. p. motor. Later we widened the belts and with less tension reduced the power to normal. The dust was still very bad, so we installed another collector unit, dividing the headers between them. There was still dust, so we covered all motors with air tight sheet iron boxes or houses ventilated by in and out pipes from outside of the building.

Now as to the results of dry cleaning. The screens will handle 30 tons per hour per battery and do perfect screening. Our experience as to capacity of cleaning tables is as follows:

No. 1 Table.....	1" to ¾" coal	12 tons per hour
No. 2 Table.....	¾" to ½" coal	10 tons per hour
No. 3 Table.....	½" to ⅜" coal	8 tons per hour
No. 4 Table....	⅜" to 3/16" coal	6 tons per hour
No. 5 Table.	3/16" to 1/16" coal	4½ tons per hour
No. 6 Table.....	1/16" to 60 mesh	3 tons per hour

A fair average of cleaning is as follows:

	Raw Coal % Ash	Cleaned Coal % Ash	Waste % Ash
Table No. 1.....	17	11	63
Table No. 2.....	17	10.5	65
Table No. 3.....	16	9.5	70
Table No. 4.....	18	10	66
Table No. 5.....	22	14	70
Table No. 6.....	25	19	70
Total	16.83	11.06	64.6

If the dust were added to the clean product, as it would be in producing mine run, the ash content would be 12.01 percent ash. The ash in picked samples of clean coal runs from 8 to 9 percent. Careful calculation from our analyses shows that 72 percent of the free impurity is removed. The amount of waste is about 10 percent of all raw coal coming to the plant.

The power required to run this plant is shown by motor readings to be 200 h. p. Four men are required—a foreman and three laborers.

SURVEY SHOWS GAINS IN ROCK DUSTING MINES

JOHN B. ANDREWS, secretary of the American Association for Labor Legislation, in a recent statement reports that a survey just completed by the Association shows substantial progress in the adoption by coal operators and by state legislatures of the safety device of sprinkling soft coal mines with rock dust to prevent mine disasters due to coal dust explosions. Eleven such disasters have occurred thus far in 1925, killing a total of 259 miners, according to the statement, the most recent being that at Birmingham, Ala., December 10, in which 61 miners were killed.

"Four states," says Mr. Andrews, "have taken pioneer legislative action to prevent coal mine explosions by means of the rock dusting safeguard. Utah, stirred by the tragic coal dust explosion in the Castle Gate mine which killed 172 miners a year ago, adopted a model safety code which requires the companies to rock dust their mines. This action was taken with the full cooperation of the coal operators. This year Pennsylvania, Wyoming and West Virginia enacted laws providing for the use of rock dust in protecting bituminous mines against disastrous explosions of coal dust.

"More than one hundred coal companies in thirteen states and in Canada," the statement continues, "have already installed the rock dust safeguard in their mines or have begun to install it. Three years ago when this Association began its present campaign for coal mine safety not more than six companies had safeguarded their mines with rock dust, and there were no rock dusting laws. It is to be hoped that the remaining twenty-one bituminous states will adopt rock dusting legislation before being visited with additional fatal explosions. There should be uniformity among the states in this important safety provision in fairness to the more conscientious operators."

The survey shows, according to the statement, that 41 coal companies in Pennsylvania have adopted rock dusting; 18 companies in Utah; 11 in West Virginia; 9 in Illinois; 6 in Alabama; 5 in Kansas; 4 in Colorado; 4 in Indiana; 3 in New Mexico; 3 in Ohio; 2 in Kentucky, and one each in Washington and Wyoming, while in Canada 4 companies are using rock dust.

"That mine disasters due to coal dust explosions can be prevented by sprinkling the underground passages with non-combustible rock dust," Mr. Andrews states, "is a scientific discovery made by government mining experts. In the past three and a half years needless coal dust explosions have killed more than a thousand miners. In the present year there have been comparatively fewer fatalities from this cause, doubtless due in large measure to the greatly increased use of rock dust.

"The rock-dusting safeguard has recently been endorsed by a safety committee of the American Engineering Standards Committee. It has been approved by the United States Bureau of Mines and the Mine Inspectors Institute of America, as well as by the miners and by progressive coal operators. In England, where rock dusting is required by law, mine disasters due to coal-dust explosions have been eliminated."

METALS

PRACTICAL OPERATING MEN'S DEPARTMENT

Practical Operating Problems of the Metal Mining Industry

ESSENTIAL CONSIDERATIONS IN SELECTING METHOD OF EXPLORATION

Exploration Is At All Times A Speculative Venture, But May Be Made Less So By Thorough Consideration Of Geological Evidence—Exploration Methods And Equipment In Prospects And Operating Mines Discussed

By GUY N. BJORGE*

THE first requisite in planning the method of attack in the search for metalliferous ore deposits, whether in the testing of a new prospect or in further exploration in old mines, is an intelligent understanding of the mode of ore occurrence. In every case where exploration is undertaken the method of attack selected is based on some theory of ore occurrence. How often such theories are erroneous, especially in the exploration of prospects, is evidenced by examples of ineffective and wasteful work in every mining district. Every engineer is familiar with such examples as: the long crosscut tunnel driven to cut the supposed ore deposit at considerable depth before sufficient work had been done to warrant the expectation that ore bodies might persist to such depth; deep development either by shaft or tunnel where the ore is clearly shallow, as, for example, a shallow island of contact-metamorphic limestone floating in an unmineralized intrusive; or the plant constructed for production on a fairly large scale where a little additional work might have demonstrated that the amount of ore that might be expected was very small.

In most instances of such ineffective work the cause may be directly ascribed to failure to make intelligent use of such information as might be obtained from a study of the geology of the area on the surface and in such openings as had already been made. In some instances, however, a study of the surface and the available openings might fail to give a clear understanding of the mode of ore occurrence. In these cases waste in exploration results from striking out boldly rather than exploring by a process of feeling the way until the occurrence is better understood.

Instances of such obvious waste in exploration are not as numerous in the case of new work in old mines because the openings already made yield more definite information as to the type of occurrence. But they are by no means entirely lacking.

To eliminate this waste the first step in the preparation for exploration should, in every case, be the collection of all data bearing on the geology of the ore occurrence and interpretation of that data in the light of present knowledge of ore deposits.

Exploration is at all times a speculative venture. Whether such exploration is warranted is wholly a matter of judgment and this judgment must be based on geological evidence. The chance for return must be commensurate with the risk involved. In other words, if the cost of exploration that must be done before positive results may be obtained is large, the profit that may be realized if the venture proves successful must be correspondingly great.

When, in any case, the decision is reached that exploration is warranted, the question arises—in the light of the information available as to the area to be prospected—what method of attack will prove most effective and economical? The factors that enter into the answer to this question in the case of new exploration in an operating mine are usualy much more complex than in the exploration of prospects.

EXPLORATION OF PROSPECTS

In the exploration of a prospect, up to the point that sufficient ore is found to assure successful operation, the only factors to be considered are the effectiveness and cost of the work. In order to reduce the risk the method of attack should be that which will *prove the worth of the prospect at the lowest possible cost.*

The question is whether to explore by drilling or by underground openings, i. e., by shaft, drifts and crosscuts. This is dependent on the type of ore occurrence and, furthermore, on how definitely the mode of occurrence is known. In

*Consulting Engineer.

new districts and in any case where knowledge of the ore occurrence is indefinite, the rule should be to *stay with the ore* until the mode and regularity of the occurrence are fairly definitely known. This, of course, entails exploration by underground methods.

There are certain types of deposits that are particularly adapted to exploration by drilling (either churn drilling or diamond drilling) and for which there is no competition between drilling and exploration by underground openings. The controlling characteristics of these deposits are large size, flat or moderate inclination, generally low grade and uniform distribution of valuable minerals, and absence of surficial guides for exploration. Steeply dipping tabular deposits may also be advantageously drilled if the ore shoots are large and the valuable minerals are uniformly distributed. Type deposits with these characteristics will be briefly described hereinafter.

Churn drills have been generally used for finding and outlining the disseminated copper deposits. These are large, low grade deposits of chalcocite and chalcopyrite rather uniformly disseminated in altered and fractured monzonite porphyry, granite and schist. The size, thickness and depth of the ore bodies are indicated in the following table:

DISSEMINATED COPPER DEPOSITS†

	Approximate Area	Average Thickness of Capping Feet	Average Thickness of Ore Feet
Utah Copper	211 Acres	110	414
Nevada Consolidated	3,000′ x 1,200′	102	218
Chino Copper		82	107
Miami-Inspiration	10,000′ x 2,000′	50 to 1,000	300 (Max)
Ray Consolidated	8,000′ x 2,500′	250	101

Churn drilling has proved most satisfactory for the disseminated copper deposits because the intense shattering makes it impossible to recover a high percentage of core in diamond drilling. New Cornelia is an exception. It was developed by diamond drilling. The core recovery was low, but accurate assays were obtained by combining the sludge and core assays in the proper proportion.

For the great disseminated lead fields of Southeastern Missouri, nothing could take the place of drilling for finding and outlining the ore bodies. The ore bodies are flat-lying and occur near the base of the limestone series at depths of 400 to 600 feet. They are up to 70 feet in thickness. There are no outcrops to serve as guides. See Fig. 1. New ore bodies are located and outlined by diamond drilling and then opened for production by shafts, drifts and crosscuts. Subsequently, underground diamond drilling is of vital importance in feeling out for additional ore bodies at short distances above or below the main ore horizon and also in picking up faulted sections of ore bodies in the main ore horizon without undue expense.‡

Churn drills are used exclusively for exploration in the zinc deposits of Southwestern Missouri and Northeastern Oklahoma. Irregular ore bodies of sphalerite in limestone lie at depths of 75 to 250 feet. The ground is fissured and brecciated and churn drills are therefore preferred to diamond drills. Churn drills are also generally used in the lead and zinc fields of Southwestern Wisconsin where very irregular ore bodies in "flats" and "pitches"occur at depths of 100 to 200 feet.

The iron deposits of the Lake Superior region have been almost exclusively explored by drilling. The hematite deposits of the Mesaba Range lie horizontally at shallow depth and are comparatively thin. These conditions are ideal for exploration by drilling. Both churn drills and diamond drills have been used, the latter being used when the holes enter taconite or other hard formations. In the steeply dipping deposits of the Marquette, Gogebic, Vermilion and Cuyuna ranges, the diamond drill has been used with holes drilled as nearly at right angles to the dip of the iron formation as possible.

Other deposits that are particularly adapted to exploration by drilling include placer deposits and residual iron ores such as the iron deposits of Mayari, Moa and Cubitas in Cuba.

Other types of deposits are more satisfactorily explored by underground openings. These have one or more characteristics that make exploration by drilling difficult and the results more or less unreliable. Such characteristics are irregularity of ore occurrence, small size of ore bodies, relative high grade of ore and erratic distribution of valuable minerals, native metallic content, vertical or steep inclination with intense shattering of ore or enclosing rock. Then there are also deposits of considerable size and regularity as, for example, outcropping and persistent vein deposits, which might be effectively explored by drilling, but for which such exploration would not make a corresponding saving in subsequent underground development.

Examples of ore deposits which have some of the above characteristics and for which exploration by underground methods in general proves more satisfactory include the following: Irregular replacement deposits in limestone such as the copper deposits of Bisbee, Arizona, the silver-lead deposits of Park City, Utah, and the complex gold, silver, lead and zinc deposits of Tintic, Utah, and Eureka, Nevada; veins with irregular ore shoots such as the copper veins of Globe and Superior, Arizona; narrow and high grade gold veins such as those of Grass Valley, California; irregular fracture systems such as the gold deposits of Goldfield, Nevada, the silver veins of Tonopah, Nevada, and the copper veins of Butte, Montana; native metal deposits such as the copper lodes of Michigan, and long continuous fissures such as most of the silver-lead deposits of Couer d'Alene, Idaho.

In planning exploration of the types of deposits of which examples are given above the choice as between underground methods and drilling is not always as positive as in the case of the deposits peculiarly adapted to exploration by drilling as hereinbefore described. In many cases it is a matter of judgment after careful study of the geology of the area. And, furthermore, even in deposits for which it is certain that underground exploration will prove to be the only effective method, a certain amount of drilling may be done to great advantage, either as a preliminary to underground work in obtaining information that may serve as a guide for, and lower the cost of, subsequent work, or to supplement the underground work.

The native copper lodes of the Keweenaw Peninsula of Michigan can not be effectively explored by drilling. But the diamond drill may prove of decided advantage as a preliminary step in locating the conglomerate or amygdaloid beds, determining their thickness, and showing the type of lode.

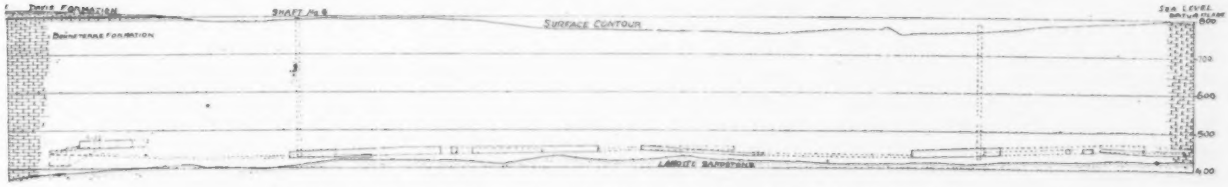
At the Premier mine in British Columbia, where the ore occurs largely as replacements in quartz porphyry adjacent to tuffs, diamond drilling proves of great advantage in locating the different bodies of quartz porphyry, some of which are more or less detached from the main intrusive. This information serves as a definite guide to prospecting underground.

In exploration by drilling the number of holes that must be drilled to obtain definite results depends on the size and regularity of the deposit. For the hematite deposits of the Mesaba Range the practice has been to put down five holes on each 40-acre tract for preliminary prospecting. The same practice has been generally followed in the lead field of southeastern Missouri and the

†W. H. Emmons, The Principles of Economic Geology.

‡H. A. Guess, Letter.

Fig. 1. *Outline Map Showing Underground Workings of Mines Nos.* 6 *and* 7, *Federal Lead Co.*



Section N. W. and S. E. Through Mines Nos. 6 *and* 7, *Federal Lead Co.*

zinc district of southwestern Missouri. In the latter districts where the ore bodies are quite irregular, failure to find ore with five holes does not finally condemn the tract. In many cases additional holes have opened profitable ore bodies. Where drilling is undertaken in more irregular deposits the holes must be more closely spaced if the work is to be effective. And, further, negative results are not necessarily conclusive.

Exploration in Operating Mines

For the purposes of this discussion operating mines may be placed in two classes, as follows:

1. Large ore bodies of the type adaptable to exploration by drilling in which the ore is rather definitely outlined before the beginning of production. Or deposits of exceptional regularity and uniform distribution of valuable minerals. In these cases ore extraction is the major problem and exploration is incidental only.

2. The more irregular types of deposits in which it is neither practicable nor economic to fully define large reserves far in advance of mining. In these the search for ore is generally a major problem throughout the life of the mine.

The following discussion of exploration in operating mines is concerned almost wholly with the latter class.

In exploration in operating mines the method of attack selected is nearly always a compromise between several more or less conflicting factors. In many cases there is no definite demarcation between exploration and development and work must be so planned that the openings will serve for ore extraction. The location of existing workings control to some extent. Problems of mine drainage and ventilation must be taken into account. The condition of the ground both within the ore bodies and in the enclosing rock will determine whether the more permanent openings can be driven in the ore or not. Where openings can be satisfactorily maintained for the life desired in the ore there is, of course, no question about keeping them in the ore. In many cases it is, however, more economical to drive the more permanent openings in the wall rock. The value of geologic information that may be obtained even where no ore is found may be important. In this, drifts and crosscuts have an advantage over drill holes because they yield more complete and accurate information.

A very large percent of the new exploration work in operating mines is done by underground openings, i. e., drifts, crosscuts, raises and winzes. Drilling may, however, be advantageously used to supplement underground openings. Drill holes may serve to pick up faulted sections of ore bodies without undue expense, to locate other ore horizons, to locate formations that may guide subsequent work, and to test the persistence of ore far in advance of mine openings for information that will help in deciding general operating policies.

When underground drilling is considered, the important question is whether it will save more than its cost in subsequent work. Unless there is a fair chance that it may save at least 50 percent more than its cost, underground openings are preferable except in cases where the time element is important.

The diamond drill has proved most satisfactory for underground drilling. Its advantages are that holes may be drilled at any inclination, several holes may be drilled fan-shape from one location, and it provides a more accurate record of the formations penetrated. It is not satisfactory in highly fractured ground in which the holes will cave and the core recovery will be low.

The churn drill has very limited use underground. The drilling rig is necessarily rather large and cumbersome. Its use is limited to vertical holes and it supplies an unsatisfactory record of the formations encountered. A small especially built underground churn drill was used with moderate success at the Old Dominion Mine in 1916. Its use was, however, limited. More recently a small churn drill outfit was tried underground at the Chief Consolidated Mines, but a few shifts proved its inapplicability.

The hammer drill for holes of moderate depth, up to 200 or 250 feet, is a recent development that may prove of considerable value. Several mining companies have (*Continued on page* 58)

EXPLORATION METHODS IN THE PARK CITY, UTAH, DISTRICT

Ore Lies At Too Great Depth To Permit Surface Drilling—Underground Drilling May Become Valuable Adjunct To Underground Methods—Outline Of Geology Of District, Origin Of Deposits And Methods Of Exploration

By E. A. HEWITT *

THE Park City District has been a noted lead-silver mining camp for the past 50 years and, strange to say, present production and also ore reserves are the largest in the history of the camp. Discovery of the Ontario lode in 1872 marks the beginning of the substantial effort to mine lode ores. This mine has obtained its production, of some forty million dollars, almost entirely from fissure veins, mainly in quartzite. Most of the other mines of the district, the Silver King, the Daly, the Daly-Judge, the Daly-West, the Park Utah, and others, were first famous for their lode ores. In the exploration of the fissure zones rich silver-lead ores were found making out from the fissures as replacements in favorable beds of lime in the various limestone formations. Thus the geological and exploration problems have become much more complex and costly.

OUTLINE OF THE GEOLOGY OF DISTRICT

The oldest rocks of the district are sedimentary, ranging age from Carboniferous to Triassic. In 1903 J. M. Boutwell classified and measured the sedimentary rocks which, in descending order, are as follows:

Name and Character	Thickness Ft.
Nugget Sandstone; Sandstones and Shales	500
Ankareh Shale; Red Shales and Sandstones	1,150
Thaynes Formation; Limestones, Sandstones, Shales	1,190
Woodside Shale; Red Shale, thinly bedded	1,180
Park City Formation; Limestones with interbedded Quartzite, Sandstone, and Shale	590
Weber Quartzite; dense, massively bedded Quartzite with some interbedded Limestone	1,350
Total	5,960

These thicknesses vary considerable; for instance, the Woodside is, in many places, as thin as 490 feet. Underlying the Weber there is a series of limestones which have been identified and are locally called Wasatch Limestone. The thickness of this series has not been definitely determined, although it seems to be at least 1,500 feet thick. This limestone has been exposed in the Ontario and in the Park Utah mine workings. The two upper formations, the Nugget and the Ankareh, have largely been eroded, occurring only in the northwestern part of the district.

The general structure of these sedimentary rocks is that of a broad anticline whose axis trends north-northeast and south-southwest, pitching towards the northeast. In some instances, notably in Frog Valley on the northern border of the district, this folding has been carried to the breaking point causing overthrust faulting of considerable displacement, more than 1,000 feet. These faults strike about parallel to the axis of the anticline and dip westward at about 45 degrees. The continuity of the Park City anticline is further broken by faulting and intrusion. The most prominent of these fault zones strikes about N. 70 E. and dips from 40 to 70 degrees to the northwest. This zone or others roughly parallel thereto is the source of most of the fissure ore of the district. There is also a series of faults varying in strike from N. 70 E. to N. 65 W. and dipping slightly to the southward or vertical. There is some question as to the relative age of these two systems, but in some cases at least the south dipping or vertical faults have been found to cut the north dipping series. The relation and displacements, in the eastern part of the district, of these fault fissures is illustrated by the ideal cross section through the Park Utah mine shown herewith.

Preceding, accompanying, and perhaps to some extent following the folding and faulting, the sediments were in vaded, domed, and altered by intrusives, mainly quartz diorite poryhyry and quartz diorite, although diorite, quartz monzonite, and peridotite are found. After an intervening period of erosion an andesitic lava spread over a considerable portion of the eastern part of the district.

ORIGIN OF ORE DEPOSITS

The ultimate source of the ore in the Park City District is thought to have been the dioritic intrusives. The northeast-southwest fissures dipping northward are roughly parallel, in both strike and dip, to the igneous-sedimentary contacts. The vertical or south dipping fissures, therefore, penetrate the main intrusive masses and are thought to have been channels through which mineral carriers have passed. The succession of geologic events leading up to and culminating in ore deposition seems to have been as follows:

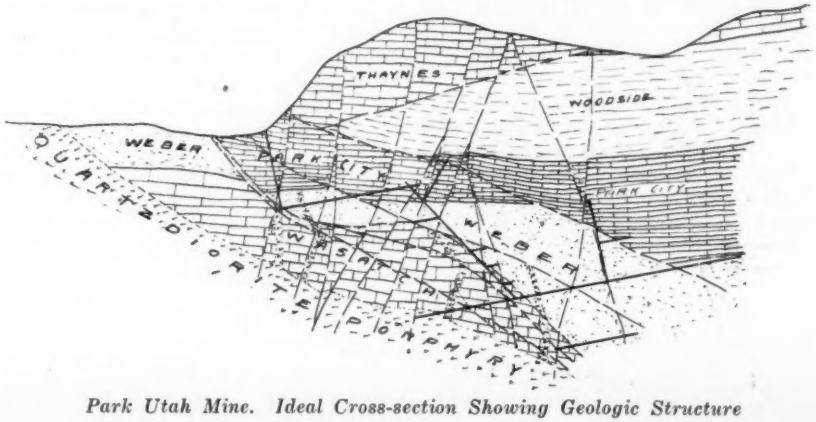
1. Sedimentary rocks were arched, folded, and initially fractured as a result of a thrusting force acting eastward and upward. The origin of this force may have been the migration of magmas as a result of isostatic readjustment of the earth's crust to the westward.

2. The sediments were invaded, deformed, and metamorphosed by dioritic intrusives, which in many cases followed the lines of weakness caused by prior fractures.

3. Accompanying and, to some extent, following the intrusions further fissuring and faulting occurred along the old fracture lines or parallel to them. This fissuring is probably the northeast-southwest north dipping system.

4. After the intrusive force had spent itself and the magmas became quiescent, south dipping or vertical fissures were formed as a result of subsidence of the cooling magmas. These fractures extended into the sediments and in some cases have cut across the north dipping fissures, offsetting them slightly and breaking through into the hanging wall sediments.

5. Mineralizing media, gases, fluids or ore magmas, emanating from the magma masses, used these south dipping or vertical fissures as channels through which they passed in reaching favorable locations for ore deposition. Upon reaching permeable beds of limestone the ore carriers formed extensive bodies of



Park Utah Mine. Ideal Cross-section Showing Geologic Structure

*Keetley, Utah.

lead-silver-zinc ores by metasomatic replacement of the limestone. As regards bedded ore this theory of origin seems to be quite well established, but the origin of the ore in the north dipping fissures is not as clearly evident. While much of the fissure ore may have been formed by mineralizing media passing upward from great depths through the north dipping fissures themselves, yet the evidence indicates that, at least, some of the ore found in the north dipping fissures arrived there through the south dipping fissures.

6. The ore deposits were subjected to some post-mineral faulting usually of small displacement, although there are instances of considerable displacement. Much of the post-mineral faulting was confined within the plane of the vein, causing a lense effect in the ore, but usually only a slight discontinuity of the ore. There are, however, a number of cross faults which have displaced the ore to some extent.

7. Some of the ore bodies to a depth of 800 feet or so are oxidized, leached and enriched by the action of meteoric waters. This process, however, has not profoundly altered the character of many ore bodies in this district.

While the north dipping fissures have developed into normal faults in many cases, they do not seem to be entirely gravity faults. The main dioritic masses in most cases lie in the footwall or south side of the ore fissures. The igneous rock in reaching its present position seems to have moved upward and to the eastward, and in so doing has caused the footwall of the fissures to move similarly. From the correlation of the formations on both sides of the McHenry fissure, which is one of the largest in the district, the footwall seems to have moved upward some 2,000 feet and to the eastward some 10,000 feet. Assuming the faulting to be largely premineral, which seems to accord with the facts, a swerve to the left, in going from west to east on the fissures, or a steepening in the dip causes the fissures to be less compressed and thus more permeable to ore solutions. The sketch of a part of the 1,500 level workings of the Park Utah mine shown herewith illustrates the relation ore shoots have to swerves in the fissure. This drifting is on one of the fissures of the McHenry system. If the surface outcrops were sufficiently exposed to permit complete and accurate mapping, it might be possible to more surely direct development. It is not to be assumed, of course, that variations in strike or dip are the only factors localizing ore shoots. Other features, such as branching or intersecting fissures, may furnish favorable loci for ore deposition.

Bedded ore has been found in juxtaposition to diorite porphyry and apparently was mineralized directly from the igneous rock; however, bedded ores are more frequently intimately related to fissures, especially the south dipping or vertical series. Usually the temperatures were too great at the contact to facilitate precipitation, so most of the high-grade lead-silver bedded ores have been found a few hundred feet from the intrusive; and, therefore, a feeding channel was necessary to the formation of bedded ore deposits.

The principal formations in which bedded ores have been found are the Park City, the Thaynes, and the Wasatch. Until recently the Wasatch had been little explored. At the Park Utah ore has been found making off into beds in the Wasatch lime, and as this formation is more thoroughly explored it is expected this limestone will also be found productive of much bedded ore.

In the Park City formation, which so far has been the largest producer of bedded ores, there are five beds of quartzite above which ore has been found. These beds are located approximately at the following distances from the base of the formation: 100, 280, 370, 435, and 485 feet. Bedded ores have also been found at the base of the formation just above the Weber quartzite and at the top of the formation just under the Woodside shale.

Exploration Methods

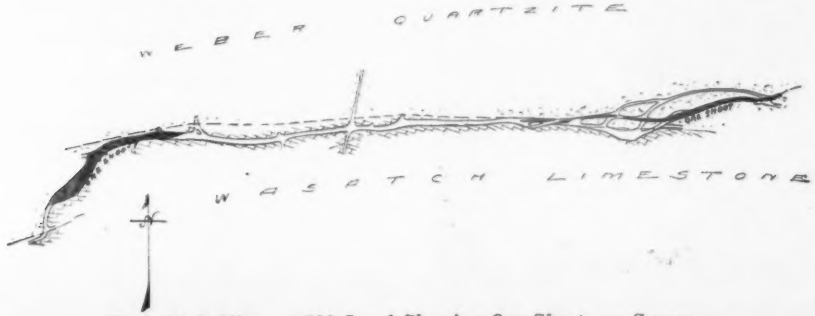
At the present time no drilling is being done as far as known. In years past some diamond drilling was done at various mines, but no ore discoveries resulted therefrom. The Ontario mine drove three diamond drill holes, each of which was about 300 feet deep. Core recovery was satisfactory and valuable information regarding the formations penetrated was thus obtained, but in each case when broken ground, such as usually is found adjacent to fault fissures, was reached progress was stopped before the objective had been reached.

At the Park Utah mine an attempt was made to explore laterally with large hammer drills operated by air. The Ingersoll-Rand Co.'s S-80 and the Denver Rock Drill Mfg. Co.'s Model 34 turbo drifters were tried. Jointed hollow 1¼-inch drill steel with a rose bit for starting the hole, followed by the usual crossbit with 10 gauges was used. One hole 66 feet deep and another hole 88 feet deep were driven. Both had to be abandoned before attaining the desired depth, due to failure of steel. Both of these holes were in quartzite. In softer formations this type of drill might be used to advantage up to 200 feet depth. In addition to having a very limited depth range, this type of drill is limited to holes having not more than 20 degrees from the horizontal.

As far as the writer's information goes, no churn drilling has ever been done in the district. For the most part, the ore deposits occur at too great depths to make it practicable to do surface drilling. However, in exploring bedded ore country it might be practicable to rig up an underground churn drill outfit capable of drilling around 500-foot holes. Such an outfit has been used at the Ruth mine of the Nevada Consolidated Copper Co. with considerable success in exploring for ore in limestone below the lowest level.

The entire development of the district to date has been done by the usual underground methods; drifts, crosscuts, and raises. A common method of attack in exploring for bedded ores is raising on the vertical or south dipping fissures to the intersections with favorable horizons. If ore is not found, drifting, either on the fissures or on the favorable bed, is then resorted to.

In conclusion: Ore in this district lies at too great depths to permit of surface drilling, either with a diamond drill or with a churn drill. While the usual methods of exploring by underground work will probably continue to prevail, yet underground drilling of some type may be found of value as an adjunct to underground methods, especially as an aid in determining geologic structure.



Park Utah Mine. 1,500 *Level Showing Ore Shoots on Swerves*

DIAMOND DRILLING CONTRASTED WITH UNDERGROUND WORKINGS FOR MINERAL EXPLORATION

Among The Several Features Which May Make Diamond Drilling Especially Desirable Are (1) Size Of Deposit; (2) Uniformity As To Grade; (3) Association Of Ore With Definite Strata; (4) Displacement Of Ore Body By Faulting

By ROBERT DAVIS LONGYEAR *

SINCE the invention of the diamond drill in 1864, there have been many keen discussions over the relative merits of diamond drilling as compared with shafts, tunnels, drifts, and other forms of underground workings when applied to exploration for mineral deposits.

There is little question that drilling is the preferable method of exploring most blanket type deposits, and that underground work is preferable for small lenticular ore shoots scattered along a narrow vein and carrying at most only a few hundred tons in each pocket. It is the large group of ore deposits that can be classified between these two extremes to which this discussion will always be pertinent.

With respect to exploration in operating mines, the aspects of this problem have changed very little with recent years. In respect to the exploration of prospects, however, the diamond drill deserves more attention now than it did twenty-five or fifty years ago. In the past, most mineral prospects were outcrops of ore. A miner of average intelligence could easily follow the ore with a shaft or tunnel and delimit sufficient ore to justify the establishment of an operating mine. But nowadays such prospects are relatively scarce. Mineral exploration is now mainly the task of searching out ore bodies which do not outcrop but whose existence is suspected either from surface conditions or from near-by known commercial deposits, or from general geological theorizing. To the sturdy prospector, with his grub-stake, his burro or canoe, his frying pan, and his unfailing optimism, belongs most of the credit for the great mineral production of North America. The days of the prospector, however, are nearly over, and he is rapidly becoming merely a picturesque figure of history. Exploration for mineral deposits is becoming more and more the exclusive task of large aggregates of capital employing skilled mining engineers and geologists and with policies guided by broad principles of world-wide economic conditions. In carrying on exploration work for new mineral deposits, the financial emphasis is no longer placed on the minimum expenditure that can give certain results, but upon the maximum results that can be obtained with a given appropriation of money. And right at this point, the proponents of diamond drilling step forward to justify their faith in the diamond drill as the most efficient method of procuring reliable information.

It is not the purpose of this article to go into detail on this subject, but merely to present sufficient material to stimulate further discussion, in the hope that additional articles will be presented for publication in the MINING CONGRESS JOURNAL and elsewhere, giving the result of specific instances, so that the mining engineer or geologist faced with the problem of determining his course in a given case can have access to the experience of others and be benefited thereby.

This discussion should focus upon the central theme of a concrete comparison between the two types of exploration under identical or closely similar conditions, so that conclusions may be drawn upon a definite factual basis and not be too greatly vitiated by a large interjection of unsubstantiated personal opinion. In the centering upon this main focus all points of view should be considered. A comparison of relative costs will be one of the chief points of interest. Certain discussion will be applicable mainly to exploration of prospects only. Other discussion will deal with development in operating mines. The mineral prospected for and the structural character of the deposit will have a very large bearing as to which method in a given case is particularly desirable. Consideration of broad, structural features, such as faulting and folding, will throw light into the focus from one side; and the narrower structural characteristics, such as lithologic texture, friability of the material, or uniformity in the dissemination of values, will shed light from a different angle.

Successful diamond drilling demands skilled handling of both drill and sample

The main consideration in all cases will be the question of the commercial value of the information obtained. It must be remembered that a diamond drill hole at best is the equivalent of one channel sample. But this channel sample, under most conditions, is a much more accurate sample than can be taken by moil and hammer. The adit, shaft, drift, cross-cut, winze, or raise, on the other hand, will usually cost more but will permit a better visual examination of the rock actually penetrated, and has the added advantage that it can be used for the removal of any ore that may be discovered. This is a real advantage over diamond drilling, even in view of the story of an actual instance in which a diamond drilling contractor was offered an opportunity to drill a gold prospect on the basis of keeping all of the core as pay for his work.

The final choice between the two methods will, therefore, depend primarily on an estimate of which method will yield the maximum amount of information with the minimum expense, and secondarily upon the utility of the openings made as an integral part of future mining operations.

There are certain general features which may make diamond drilling especially desirable. Four of the more important of these general features are:

(1) Size of the deposit: The diamond drill is particularly applicable for ex-

*President, E. J. Longyear Company.

ploring large deposits such as iron ore and disseminated copper deposits.

(2) Uniformity as to grade: A relatively small number of drill holes will prove the average value of a coal seam or the average grade of an iron ore deposit, while to explore a narrow quartz vein with "spotty" values, drill holes might have to be spaced so closely together that a series of drifts and raises would be cheaper. Massive sulphide deposits as at Jerome, Arizona and Flin Flon, Manitoba, are particularly well adapted to exploration by diamond drilling.

(3) Association of the ore with definite strata or with other characteristic geological formations or structures: Coal and all sedimentary deposits have this feature. In the Sudbury Nickel District the ore occurs near the basal contact of an intrusive sill of norite with the underlying rocks. Exploration by drilling is definitely confined to this ore zone. In a great many cases where it is deemed necessary to carry out the search for ore bodies by underground mining methods, much unnecessary barren work can be saved by some preliminary diamond drilling to locate formational contacts, brecciated zones, faults, or other structural features, the position of which may have an important bearing on the general plan of underground work.

(4) Displacement of the ore body by faulting and consequent difficulty of following it by underground mining methods: This situation occurs very frequently in the lead silver mines of the west, and the diamond drill is called upon to save the ore from premature exhaustion.

Iron ore deposits seem to be particularly suitable for diamond drilling because they are large and possess sufficient uniformity as to grade to permit close estimates of tonnage and grade from drilling alone. In the Lake Superior Iron Districts, hundreds of millions of tons of ore have been leased or sold on the basis of no other information except drilling.

Coal seams, gypsum beds, and other sedimentary mineral deposits are usually explored by drilling instead of by underground methods, because the uniformity in composition inherent in sedimentary formations enables a few drill holes to indicate the general characteristics over a large area.

In many operating gold mines, the diamond drill has proved to be of great value for exploration work, notably in the Rand District, the Porcupine District, and the Black Hills District.

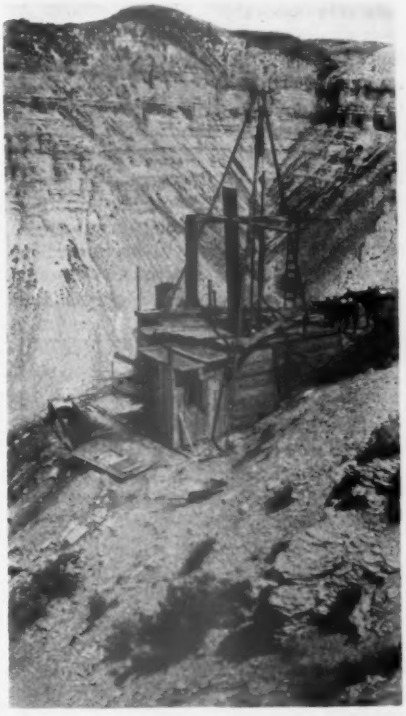
The drilling of thousands of holes in the Rand, many of them over a mile deep, is well known to mining men. The ore occurs in steeply dipping conglomerate beds. Diamond drilling is used to determine the position of the conglomerate and the approximate gold value considerably ahead of mining operations and at a great saving in costs compared with underground methods.

In the Porcupine District, the gold occurs as a series of roughly parallel quartz veins in schist. Particularly in the Hollinger Mine, the diamond drilling forms a part of a very regular and systematic underground exploration campaign. From various points along the main haulage levels and drifts, lateral holes are drilled to scout the rock on either side. Cores are assayed to determine the presence of gold, and when any is found the drilling is followed up with underground openings. A large amount of needless cross-cutting in barren rock is saved in this way.

In the Homestake Mine in the Black Hills District, diamond drilling precedes all underground development.

The diamond drill can usually be depended upon to furnish an accurate sample, if both core and sludge are carefully preserved and analyzed.*

The necessity for careful handling of core and sludge cannot be over emphasized. Practically all of the expense of diamond drilling goes for drilling a hole in the ground; but all of the value lies in the sample recovered. For a very slight additional cost one can have a complete and permanent record of the material drilled where otherwise he would have only a worthless hole in the ground and his memory for future reference. It is not advisable to follow the precedent recently established in Missouri where a shaft was sunk, based only on the information given in the driller's statement that the diamond drill hole at that point was a "hell of a good hole."



Diamond drilling for oil shale near De Beque, Colo.

An interesting check in the value of diamond drill samples was carried out on the New Cornelia property. As reported by Joreleman,† "The channel samples of test pits in carbonate ore averaged 0.005 percent lower than corresponding diamond drill samples; the test pits and raises in sulphide ore averaged 0.05 percent lower than the corresponding drill samples; and the drifts in sulphide ore averaged 0.26 percent higher than the assay value of blocks of ore through which the drifts were run as indicated by drill holes at the corners of the blocks."

The value of "wedging" a drill hole, or deflecting it so as to take a second sample from a deposit without redrilling the entire amount of hole is not always appreciated. On deep holes a great saving in costs can be secured in this manner.

Several samples can be secured from one set-up by drilling a number of holes in different directions or at different angles. The El Potosi Mine in the Santa Eulalia District makes a practise of drilling a fan-shaped section of holes from each set-up, and secures an exceedingly low cost.

The above remarks were drawn at random from experiences and observations covering a large amount of diamond drilling. The inferences in each case are largely qualitative in character. I would like to make a plea for the publication of definite quantitative data in this subject of continually increasing importance. The engineer or geologist who is now working on some phase of this problem, or who has worked on it in the past, may have some interesting data that would be of value as a contribution to the profession. The magazines and technical journals are open for his use. May we not hear further on this subject?

At the Philadelphia Exposition from June to December next, exhibits of the mineral industry will be shown. They will include the sinking of an oil well and all phases of oil production. Large steel manufacturers will illustrate their industry from the treatment of ore through the various stages of fabrication.

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*R. D. Longyear: Diamond-Drill Sampling Methods. Trans. Am. Inst. Min. & Met. Eng., Vol. LXVIII, p. 423-429, 1923.

†Ira B. Joreleman: The Ajo Copper Mining District. Trans. Am. Inst. Min. Eng., — Vol. XLIX, p. 606, 1914.

CONSIDERATIONS IN SELECTING METHOD OF EXPLORATION

(*Continued from page* 59)

experimented with such a drill. At the Chief Consolidated Mines* a hammer drill has been used for prospecting for the past two years. Holes have been drilled to a maximum depth of 272 feet, but the average depth has been less than 100 feet. The cost per foot for such drilling in 1924 was 97 cents. Its use has proved successful in locating ore and also, it is claimed, in obtaining geological data. At the cost given, drill holes may often take the place of short crosscuts.

In underground drilling much depends on the proper placing of the holes and this is of course partly controlled by the location of existing mine workings. Holes should be drilled as nearly at right angles to the major axes of the ore bodies as possible. This often necessitates extending drifts or crosscuts in order to reach the proper location. A saving in the footage of work done to reach the proper location for a hole may be wasteful if the results obtained from the hole are poor and unreliable.

In irregular deposits or deposits with erratic distribution of valuable minerals it is unsafe to place too much reliance on results obtained from one or two holes, especially if such results are negative. Drilling is more likely to prove satisfactory if a number of well-placed holes are drilled. Finally, careful study of core and sludge and intelligent interpretation of results are essential if the best results are to be obtained.

‡ Chas. A. Dobbel, Deep Hole Prospecting at the Chief Consolidated.

GAS MAKING FROM WESTERN COALS

IN cooperation with the Pacific Coast Gas Research Council, a study is being made by the Bureau of Mines of the feasibility of utilizing coals available on the West Coast for the manufacture of city gas. Laboratory studies of the gas-producing qualities of various western coals, operating tests in gas plants, and the economic possibility of using them for the manufacture of city gas will be investigated.

ANALYSES OF FOREIGN COALS

THE analyses of various coals from China, Japan, New Zealand and Australia are given in Serial 2708, recently issued by the Bureau of Mines. The analyses were made in connection with tests of these coals, and are published in response to a demand for comparative information relating to the characteristics of coals of different foreign countries.

TESTS OF SMALL FURNACES

THE relative thermal efficiency and the economy in the use of the available fuels in domestic furnaces is of great interest to all householders; also a knowledge of the design or arrangement of the furnace best suited to each fuel is necessary. Investigations have been conducted by the Bureau of Mines on the burning of anthracite and bituminous coals, coke, and natural gas in a small furnace in which the amount and arrangement of heating surfaces could be varied. This work has been done in cooperation with the laboratory of the American Society of Heating and Ventilating Engineers. It has included a close study of the process of combustion, particularly for bituminous coal. Small furnaces, it is pointed out, tend to permit the smoke and tars from this fuel to pass into the chimney unconsumed due to the comparatively low temperatures and short gas travel pertaining, and thus reduce the efficiency and contribute to the smoke nuisance.

REFRACTORY SERVICE SURVEY AT POWER PLANTS

THE service which a refractory will give in a boiler furnace is fixed by the properties of the refractory itself and the conditions to which it is subjected. It is well known that the deterioration in service is greater than that which standard laboratory tests indicate and that the furnace temperature alone does not fix their length of life. Considerable laboratory investigation has been done on refractories, but there has been little coordinated study on the relationship of the refractory, fuel used, and furnace conditions. To attempt to remedy this and to obtain some measure of the relationship, a thorough study has been started by the Bureau of Mines of the Department of Commerce. A preliminary survey was made of a number of representative power plants in widely separated locations and using different fuels, and the data gathered coordinated, and presented in a report to the cooperative committee represented by Mr. C. F. Hirshfeld, of Detroit. The first intensive study of a particular plant was made at that of the New York Edison Company, at Sherman Creek. Due to other experimental work being conducted there, furnaces using both stokers and powdered coal were available, so that measurements of furnace operations under a variety of conditions were possible. Special furnace setting modifications were put in by the company and continuous records obtained of refractory and furnace temperatures as well as records of the fuel, boiler operation, and flue gas.

The next intensive study will be at the plant of the Chicago-Edison Company, and will be partly in further cooperation with the University of Illinois, which is conducting special investigations for that company.

ERROR

We wish to correct a typographical error in the article by C. A. Lemke on New Flotation Mill of the United States Smelting, Refining and Mining Company, which appeared in our December issue.

On page 622, third column, thirteenth line, the quantities of oils used in the zinc circuit are given as 4 pounds pine oil, 4 pounds Barrett or Republic, and 1 pound hardwood creosote. All of these figures should have a decimal point in front of them.

PROMISING IDAHO COPPER DISTRICT

A PROMISING copper district in Lemhi County, Idaho, in the vicinity of Salmon, is described by a geologist of the Department of the Interior in a report by Clyde P. Ross, just issued by the Geological Survey as Bulletin 774.

Idaho is well known to mining men for its silver-lead mines and, especially in early days, for its gold placers, but its copper deposits are less famous, although copper has been produced in a number of places in the state. Some copper ore has been shipped from the Salmon district, but most of the properties are now in the development stage or are mere prospects. When general conditions in the industry become more favorable to new development and the deposits are more adequately opened up, the district may yield a considerable tonnage of copper ore. Mr. Ross discusses the major features of the geology of the deposits and offers some suggestions to prospectors.

SAFETY WORK IN MID-CONTINENT OIL FIELD

H. C. FOWLER, associate petroleum engineer of the Bureau of Mines, recently made a number of short trips through the active oil fields of Kansas for the purpose of observing safety practices. An opportunity was thus given to compare the safety work in old fields, such as Eldorado and Augusta, with the newer activities of the Winfield and Rainbow Bend fields. This work supplements similar studies formerly made by the Bureau of oil-field practice in California and Oklahoma.

CRUDE OIL PROPERTIES

A STUDY of the properties of typical crude oils from the producing fields of the western hemisphere has been made by the Bureau of Mines. A report on the subject, just issued, includes comments, tabulated data, and individual analyses of crude petroleums typical of the producing districts of Canada, Mexico, Trinidad, Venezuela, Argentina, Colombia, and Peru. For purposes of comparison, the report also contains analyses of typical crude oils from the largest producing districts of the United States.

The Bureau of Mines undertook a study of foreign crude oils for two reasons: First, foreign fields are potential sources of supply for the United States; in fact, considerable quantities of some foreign crudes have already been imported. Second, these oils are very similar in physical and chemical properties to oils found in the United States and a study of these resemblances has scientific value.

Despite the wide geographical distribution of the producing fields of Canada, the bureau found the crude oils of the Dominion to be remarkably alike. The producing districts represented by analyses in the report just issued are the Calgary field of the Province of Alberta, the fields of the Province of Ontario, the Stony Creek field of the Province of New Brunswick, and the MacKenzie district of the Northwest Territories by one sample from the Fort Norman well.

The samples of Mexican crudes are divided into two groups based on the geographic position of the fields and the relative gravity of the oils. These groups are designated as the Northern heavy-oil district, or Panuco district, which lies about 50 miles west of Tampico and includes Ebano, Panuco, Cacalilao, and Topila, and the Southern light-oil district, also known as the Tuxpan or Tepetate district, which extends from Dos Bocas 45 miles southward to the Tuxpan River. Although the Topila field is geographically in the Northern heavy-oil district, the oil seems to be a hybrid, intermediate in characteristics between the heavy, low cold-test oils of the Northern district and the lighter wax-containing oils of the Southern district.

The petroleum production of Trinidad centers about the famous Pitch Lake. Approximately 90 percent of the total production of Trinidad has been yielded by fields within 7 miles of this lake, and by wells on the southwest peninsula. Except the samples from the Tabaquite field, the samples of Trinidad crude examined have a low gasoline content. The Tabaquite field is represented by two samples classed as "waxy crudes" and two classed as "nonwaxy" crudes. The waxy crude is quite similar to the lighter Oklahoma crudes, such as those from the Newkirk and Ponca fields of Kay County.

Argentine fields are represented by four samples: Two from the Comodoro Rivadavia field, which is almost entirely exploited by the Argentine Government, one sample representing government production in the Plaza Huincul field and one representing oil produced by Petroleo de Challaco, Ltda., in the Mendoza-Neuquen field. The Comodoro Rivadavia crude is a heavy, black oil of about 20 degree gravity; it contains practically no commercial gasoline, as it shows only about 5 percent of "gasoline and naptha" by the Bureau of Mines analysis and interpretation. The samples from the Plaza Huincul and Mendoza-Neuquen fields have a lighter gravity and higher "gasoline and naptha" content than those from Comodoro Rivadavia. They are in many ways similar to the crude oils of northern Texas.

Two samples from the Lake Maracaibo basin in Venezuela, are included in this paper. They are fairly heavy, black oils, rather high in sulphur, rather low in "gasoline and naptha," and containing considerable proportions of vacuum distillates, which do not show wax content. They show no kerosene distillate by the Bureau of Mines analysis and interpretation. The carbon residue of residuum is high, as might be expected from the large content of sulphur. The samples are similar to many of the crudes, especially the heavier high sulphur oils, of Kern County, Calif.

Two samples from the Infantas field of Colombia are represented. This field, in the Department of Santander, is about 18 miles ease of the village of Barranca Bermeja on the Magdalena River, some 400 miles from Cartagena. The two crudes, which are black, have a sulphur content of 0.70 percent, low pour point, low viscosity, fairly high content of "gasoline and naptha" and considerable proportions of lubricating distillates. The carbon residue of residuum is fairly high. The wax content is inconsiderable.

The production of Peru is represented by two samples; one a "waxy" crude, called "high cold-test crude," and the other a "non-waxy" crude from the Lobitos field. These crudes are characterized by a fairly light gravity, a high "gasoline and naptha" content, unusually small proportion of sulphur, low viscosity, and considerable proportions of commercial fractions. The carbon residue of residuum is low in view of the large proportion of total distillate.

The results of this survey are contained in Technical Paper 346, by A. J. Kraemer and L. P. Calkin, copies of which may be obtained from the Bureau of Mines, Department of Commerce, Washington, D. C.

BIBLIOGRAPHY OF SAFETY IN OIL INDUSTRY

IN RESPONSE to numerous requests from safety engineers, a "Bibliography of fire hazards and prevention, and safety in the petroleum industry" has been prepared by the Bureau of Mines. The bibliography, which has been compiled by Miss H. Britton and H. C. Miller of the San Francisco office of the Bureau of Mines, is in two parts. Part I relates to fire hazards and prevention, and Part II to safety and safety devices. Several hundred magazine articles, official reports and miscellaneous documents dealing with accidents and accident prevention in connection with the production, transportation, refining, storage, distribution and utilization of petroleum are cited. Special attention has been given to legislation and legal regulations along safety lines.

In view of the safety movement which has recently gained great headway in the petroleum industry, it has been decided to issue a special safety bibliography at yearly or semi-yearly intervals. Copies of the bibliography may be obtained by applying to the United States Bureau of Mines, 506 Customhouse, San Francisco, Calif.

SAFETY IN WYOMING OIL INDUSTRY

AS a part of the safety program being conducted by the Bureau of Mines, in the oil producing and refining industry, the crew of mine safety car No. 2 recently gave first aid training to 347 out of a total of 351 men on the pay roll of the Producers and Refiners Corporation at Parco, Wyo. This company has adopted the policy of "Every employe a first-aid man," and has arranged to conduct bi-monthly first aid courses.

FOREIGN OIL SHALE PLANTS

A FIELD study of oil shale plants operating in Scotland and France has been completed by M. J. Gavin, an engineer of the Bureau of Mines The purpose of sending Mr. Gavin abroad was to obtain first hand information on the industrial and technical development of the industry, and to correlate his findings with data on the technique of retorting oil shales developed in the experimental work of the Bureau of Mines and its cooperating agencies in this country, preliminary to the construction of a large-scale experimental plant for refining oil shale.

THE NATION'S VIEWPOINT

A Digest Of The Expressed Opinions Of Leaders In American Affairs

GOVERNOR PINCHOT'S action in calling a special session of the legislature is not meeting with the commendation of the press. The *Pottsville Journal*, published in the heart of the anthracite district, feels that the action of the Governor is only another obstacle to be overcome before negotiations can go forward. In a recent editorial they say:

"So far as settling the anthracite strike is concerned the special session of the legislature, called by Governor Pinchot, will be a deception and a snare.

"The strike cannot be settled by legislative enactment; it can be settled by only the parties to it, the operators and the miners.

"Governor Pinchot's call specifically provides that legislation be enacted 'to regulate through an appropriate agency, any and all of the business of producing, preparing, selling and distributing anthracite for domestic use in Pennsylvania' and further 'to authorize compacts with any or all anthracite consuming states and the District of Columbia for the regulation of any or all of said businesses in the contracting states through an interstate Commission or otherwise.'

"Consider for a moment how absolutely farcical all this is, in so far as the termination of the strike is concerned. Before compacts could be made with anthracite consuming states authorization to enter into such compacts would have to come from the legislative bodies of such states. Does any one suppose that all of such states would follow Pinchot's lead and call extra sessions of the legislative bodies? The thought perishes with its birth.

"The anthracite strike should be settled and there is only one place where it can be and properly should be settled, and that is in a joint conference between representatives of the operators and representatives of the mine workers.

"Legislative tinkering will not settle the controversy; will not and can not touch the vital points in contention.

"Let neither side be deceived by the legislative gesture, but let them move together and compose their differences upon some practicable, workable and lasting basis."

Commenting upon this same question, the *Philadelphia Public Ledger* believes that Governor Pinchot is simply running true to form and living up to his motto of "more, not less, government in business." They further point out:

"It is natural that he should turn to regulation for a weapon in handling the hard-coal strike. His efforts at intervention have failed dismally. Therefore he summons the legislature and asks it, among other things, 'to regulate, through an appropriate state agency, any or all of the businesses of producing, preparing, selling and distributing anthracite coal for domestic use in Pennsylvania, to authorize compacts with any or all other anthracite-consuming states and the District of Columbia for the regulation of any or all said business in the contracting states through an Interstate Commission or otherwise.'

"This is a swinging of the club of state and interstate regulation over the head of the hard-coal industry. More than that, it is a menace to the very public interest which Pennsylvania's Governor so often professes his anxiety to serve.

"Undoubtedly it will destroy such hopes as there may have been of any immediate peace. The delay, already long, is certain to be longer, unless operator and miner act to save their own industry in the meantime. The principal value of the Governor's demand is as a threat that may bring the anthracite people to their senses.

"Should the Pennsylvania legislators accept the Pinchot view and declare the industry a public utility, subject to state and even interstate regulation, what then? Interminable litigation would begin. Present controversies over wage and working conditions would continue. Mere declarations that coal is a "public utility" which shall be and is subject to regulation will not prevent strikes and suspensions. No law has ever been framed that can keep free men at their work when they choose to strike.

"The quarrel between coal miner and operator cannot be settled by legislative enactment. They are divided over economic and not political questions. Wages, working conditions, unionism and problems in and peculiar to their own industry are the matters at issue. Neither state nor interstate action can reach these fundamental questions.

"Nor can public sentiment make itself felt much more

Wall Street Journal

In the Public Eye Again

Wallace Press-Times

Somebody's Going to Have a Puzzling Time

Wallace Press-Times

Back on the Rock Pile

forcibly through another set of bureaus and bureaucrats than it does now. Regulation will scarcely reveal any more information about the financial situation and profits of anthracite than is now a matter of public record in the report of the United States Coal Commission of 1923.

"The most to be said for this proposed intervention is that it recognizes the public's interests are being injured by the coal quarrel. It will further harass an already troubled industry. It will mean unending court action and perennial controversy. Forcing the status of a public utility on the industry will be fought tooth and nail. It is easy to make out a case showing anthracite to be a monopoly in the matter of its production. Yet any monopoly that has lost and is losing its markets to other fuels is not altogether a monopoly.

"The remedy Governor Pinchot proposes might well be worse than the disease he wants to cure. It cannot guarantee lower prices to coal users or secure them against interruption of supply. Nor can it force men back in the mines when they are unwilling to go. It proposes more rather than less official meddling, and thus far about all the public has ever got out of official tinkering with a hard coal strike has been higher prices for coal.

"Declaring hard coal a public utility would set a dangerous precedent. The way would be smoother for more public meddling with other private industries. There is no logical place to stop in the application of this socialistic theory. Modern civilization with its interrelations stamps a "public interest" on well-nigh every business.

"Pennsylvania's legislators should make short work of the Pinchot panacea. It means more boards, more jobholders, more bureaus and more bureaucrats. With it would come all the attendant evils of the politics and the political manipulations that damn so many state and Federal agencies in the eyes of the public. It deserves defeat and should be emphatically rejected."

TOOOOOOT
NOW LISTEN HERE, OLD TOP - I JUST WANT YOU TO REMEMBER THE UNSEEN MILLION FIZZLE AND UNNECESSARY LAWS YOU'VE MADE FOR ME ALREADY AND GOVERN YOURSELF ACCORDINGLY
U.S. LAW FOUNDRY
CONGRESS
JOHN PUBLIC

Wallace Press-Times

And Keep Us Out of World Courts

The *Black Diamond* of Chicago has consistently advocated the operators' arbitration plan for the settling of the anthracite situation and in a recent editorial again reiterates the fairness of that plan, saying:

"Two weeks before Governor Pinchot requested the operators and miners to accept his unworkable plan for settling the anthracite controversy, the anthracite operators had themselves offered to Mr. Lewis a fair and impartial plan for ending the dispute. Their plan did not insist that there would be either a decrease in miners' wages or renewal of the present scale. The one-sided plan of the Pennsylvania executive provided only for the present scale of wages or an increase. The plan of the operators was that an impartial board should be organized to study the facts on both sides of the anthracite controversy and make a decision on the basis of the evidence gained thereby. The board, consisting of seven members, under the operators' plan, would make an award which could be renewed annually, but which would be for a period of five years. The plan would end the periodical stop-

pages in the production of anthracite coal.

"There could be but one objection on the part of Mr. Lewis to such a plan. When two disputants are as far apart as the anthracite operators and the miners, some impartial arbiter or arbiters must enter the picture to give their weight fairly to one side or the other. The anthracite operators have recognized this vital factor in the settlement of industrial disputes. John L. Lewis refuses to recognize it. Gifford Pinchot is not to be considered an impartial arbiter.

"The plan of the operators has been conceived in a spirit of fairness to both sides. That is the basis of arbitration. The Pinchot plan has no elements of fairness or justice in it and does not permit an unrestricted determination of the facts and award based upon them. It is not in the least surprising that the operators quickly refused to accept it and that John L. Lewis did accept it without the slightest hesitation. When arbitration comes in the anthracite wage dispute the arbitrators will be of such standing that no one will be able to tell in advance the nature of their final award. This being the case, Governor Pinchot does not qualify."

The rapidity and efficiency with which the 1926 revenue bill was passed by the House is meeting with the approval of the press. The *New York Times* believes that the action of the House was a real legislative achievement. They further say:

"The passage by the House of Representatives of the tax bill is a piece of work almost without precedent. Here is a new Congress just beginning its sessions, yet within two weeks of organization it has reported, debated and enacted a long, comprehensive and most important bill. Such a thing could not have come by accident. It was the result of planning far in advance. First of all, the Speaker of the new House was selected long before its first session. Even more strategically, the Ways and Means Committee was appointed. Thus it was able to get to work on the tax bill weeks before Congress met. It held hearings, and after them carefully prepared the measure to be reported out almost on the first day of the session.

Wall Street Journal

Lock Them Out

Then the legislative process was speeded up and the bill became a law, so far as the House of Representatives was concerned, with unparalleled ease and rapidity.

"In all this there is something more than the triumph of party discipline. There is the triumph of a political idea. More than two years ago the Washington Administration announced through Secretary Mellon a plan of tax reduction on scientific and sensible lines, which Congress refused to accept, save in a mangled form. But the ideas have all the while been germinating. Now they are coming to flower. One of the most unusual features in the drafting and enacting of the tax bill has been the general acquiescence in its details and the non-partisan nature of its support. The conceptions and principles laid down by Secretary Mellon in 1923 have quietly forced their way to recognition. The stone which the builders rejected has become the head of the corner. In giving praise to the House of Representatives for the speed and efficiency shown by it in passing the tax bill, let us not forget those whose firm grasp of truth and energy of thought furnished the driving power to the whole movement, which so long seemed halted, but is now passing quickly on to its original goal."

Wallace Press-Times

Modern Swords of Damocles

The hue and cry against the encroachment of government in business has not died down. Looking at it from another angle, the *Bache Review* believes that the Sixty-ninth Congress has it in its power to greatly benefit business and says:

"For the first time in the history of the country, at least for 50 years, Congress goes into session practically, and more or less openly, committed to help business. This does not mean that it is unanimously so minded or pledged, but all the evidences are sufficient to make for the belief that it is not to be the threat and the obstacle that it usually is. So that business, as Congress convenes, is pursuing its course without trepidation.

"There have been other periods in our political history when business has been more or less jointly in the saddle with one or the other of the Presidential administrations. But in those periods business was regarded with suspicion by many people not of it, and there arose ultimately bitter opposition which culminated in the passage of restrictive measures with teeth in them, like the Sherman law, and which measures have ever since, with gradually reduced pressure, been great obstacles to the progress of industry.

"The attitude of Congress is not only passively favorable, but actively committed to some important legislation which will be a positive benefit to business—notably that of tax reduction.

"This Congress was placed in power by the 1924 election, and some leaders in it assert that it got its instructions from the people at that election to reduce

Providence Journal

The Rising Tide

N. Y. Evening Post

Is There a Santa Claus?

taxation, reform the tax laws on sound lines, cut down appropriations to levels of the utmost economy, and to cut out all legislative novelties and nostrums. That such an impression prevails is propitious both for business and for the people who recorded the verdict. The insurgents, however, are not at all dead and opposition and debate must be expected on a number of points which furnish facilities for soap boxes and oratory."

In commenting upon the recent meeting in Washington of 180 industrial leaders to protest against government in business, the *Salt Lake Mining Review* quotes Brig. Gen. Richard C. Marshall, Jr., of the Associated General Contractors, saying:

"In outlining the aims of the Associated General Contractors of America to counteract the present inclination of governments 'to go into business,' Brig. Gen. Richard C. Marshall, Jr., of the association, pointed out that the American business man in many different lines of endeavor, has figured out that Government employes, whose wages and salaries he helps to pay as a taxpayer, are becoming more and more his competitors. He stressed the point that work generally conducted under Government auspices is done under methods that result in from 25 to 100 percent more cost than it would by contract.

"'It is boring from within that is more insidious than any political fight ever undertaken,' he said. 'The extent to which the Federal Government is "in business" has more than doubled within the last five years so that now at least one person out of every 11 is a Government employe.

"'It is the purpose of the Associated General Contractors of America to bring to the attention of the people of the country the great danger which is menacing the industries and then, by legislation, to endeavor to curb the growing tendency of government to enter business.

"'While I speak generally of the Federal Government, the same is applicable to state and municipal governments. This policy has gained such a foothold in the last few years that some of the states are doing all their public work by day labor.'

"Powerful political machines and tremendous waste inevitably creep in where public work is carried on by officials without the check of competitive bidding which acts as a brake on careless expenditure of public funds.

"The Government should be kept out of all business. Private individuals and the private industries which pay the taxes to maintain Government, should do the work for the Government, and should not be subjected to Government competition in the line of business in which they are engaged. General Marshall has sounded a timely note of warning which attracted the attention of numerous other business organizations which have joined in a call for a mass meeting in Washington on the 10th of December."

Secretary of Labor Davis, in his report on the immigration situation, paid a very glowing tribute to the immigration law and what it has accomplished. From the East frequently is heard the statement that the coal mines are overmanned, that there are too many miners. From the West, and particularly the copper districts of Arizona, the reverse is heard. In commenting upon this situation, the *Arizona Mining Journal* says:

"Industry in the United States is growing and growing rapidly, and as it grows it needs more labor. This labor must be supplied from one of two sources—from within, by the training of our young people to take their places in industry, or from without, by bringing in the necessary labor supply from outside the United States.

"If the United States is to progress industrially, it must have sufficient labor. Our present immigration laws provide for a certain definite and limited quota to come into this country each year from each of the foreign countries. It is a case of first come, first served, until the quota limit is reached, subject, or course, to the usual examination of health,

Washington Post

Always Spouting

The Home News

Something is Wrong Somewhere

etc. It does not provide for any fulfilling of quota from another country if one country fails to send in its allotted amount.

"We doubt if there are many people in the United States who would desire to go back to the old system of unrestricted immigration, letting in the diseased, the crooks, the reds and many other types of undesirable citizens, but we feel that some system should be provided whereby we could still retain the provisions of the quota law and yet select those who come into this country, this selection to be from the point of view of health, willingness to work, desirability as citizens, the capability of the industry of the country to absorb them, etc.

"The mining industry, as well as every other industry that uses labor, is suffering from the condition which throws the whole immigrant supply into the melting pot of New York City, where foreign countries, speaking and doing business wholly in foreign languages, are growing up within our borders. The present system does not throw the men into industry, it does not so scatter them throughout the United States that they may become imbued with American ideals and inspiration.

"Selective immigration, rather than merely restricted immigration, will do a lot to correct conditions. The placing of immigrants where industry needs them can largely correct the shortage. It is an important question and worthy of most sincere consideration."

President Coolidge in his address before the New York State Chamber of Commerce had the following to say about the administration's protective tariff policy:

"It has sought to stimulate domestic production by a moderate application of the system of protective tariff duties. The results of these efforts are known to all the world. * * *

"By these wise policies, pursued with tremendous economic effort, our country has reached its present prosperous condition. The people have been willing to work because they have had something to work for. The per capita production has greatly increased. * * *

"Every one knows that it was our resources that saved Europe from a complete collapse immediately following the armistice. Without the benefit of our credit an appalling famine would have prevailed over great areas. * * *

"It is notorious that where the Government is bad, business is bad. * * *

"In 1920 wages were about 100 percent above the pre-war rates and the average wholesale price of commodities was about 120 percent above the pre-war rates. A steady increase in the wage index took place, so that during the last year it was 120 percent above the pre-war rate. As the cost of our production is

Memphis Commercial Appeal

While Thugs and Thieves Rejoice!

Wallace Press-Times

Now Comes the Ringmaster's Task

Washington Star

Regulating World Court Traffic

so largely a matter of wages, and as tax returns show that for the last year profits were ample, it would naturally have been expected that the prices of commodities would have increased. Yet during this period the average wholesale price level of commodities declined from 120 percent above the pre-war level that it was in 1920 to only 57 percent above the pre-war level in 1925. Thus, as a result of greater economy and efficiency, and the elimination of waste in the conduct of the National Government and of the business of the country, prices went down, while wages went up. The wage earner receives more, while the dollar of the consumer will purchase more. The significance and importance of this result cannot be overestimated."

Uncle Sam as a landlord was the topic selected by **Dr. George Otis Smith,** Director of the United States Geological Survey, in a recent address before the Maine Society of New York. In commenting upon the Government's policy concerning the leasing law and mineral deposits, Dr. Smith said:

"For more than a century the public land policy was one of short cuts to settlement and development—land grants for wholesale items and homesteads and mineral claims for retail. Twenty years or so ago limits could be seen to the supply of land, and Uncle Sam began to watch his step. The political name given to this attitude of caution was conservation, but in a smaller business concern it might have been called making provision for future operations.

"The store of energy possessed by any country is its greatest asset, so that our national inventory of tons of coal, barrels of oil, and second-feet of water is a measure of potential aid ready for American workers of the future. The limit to be placed upon industrial progress is likely to be fixed by the amount of power available for doing our hard work, whether on the farm or in the factory. Our plain duty is to safeguard the future by following a business-like policy in developing these stores of coal and oil and utilizing these water-power sites.

"Chief among the recent changes in Uncle Sam's real estate business was the introduction by Congress of the system of leasing the public oil and coal lands to private operators. Already there are in force more than 200 such leases of coal land and 450 of oil and gas land. Last year nearly 2,000,000 tons of coal, more than 30,000,000 barrels of oil, and 16,000,000,000 cubic feet of natural gas were taken from the people's estate, and in return nearly $8,000,000 was paid into the public treasury.

"A group of geologists and engineers look after the Government's interest by classifying the mineral lands and determining their value, and by inspecting the mining operations and cooperating with the Government lessees in avoiding waste. The unit in the great Federal service that does all this work is the conservation branch of the Geologi-

Homeless Hector Looks Mangy, Cal!

cal Survey, in the Department of the Interior. The name given to this unit is descriptive of its purpose—full and wise utilization both now and in the future.

"Avoidance of waste is a very practical sort of task, but it brings an immaterial reward along with the material gains: the Government engineer finds cause for pride in the fact that under his supervision the wells on the Government leasehold are yielding on the average a few more barrels daily than the wells on the adjoining land in private ownership; or in the fact that by his advice, based on wide experience, the Government coal lessee has cut operating costs several cents a ton; or, best of all, in the fact that under his strict inspection the mines on Government land are in the van in putting into practice all the safety precautions suggested by the scientific investigations of the Bureau of Mines.

"It is with such a vision of something larger than the dollar of today's rental that Uncle Sam's real estate experts make plans and then help to execute them in this greater project of using these resources wisely. That vision comprehends hundreds of power sites with potential energy aggregating 25,000,000 horsepower; 30,000,000 acres of coal lands with more than 200,000,000,000 tons of valuable coal; 500,000 acres of phosphate lands that can supply 8,000,000,000 tons of this essential fertilizer as its need on American farms is realized; and 4,000,000 acres of oil shale, from which possibly 60,000,000,000 barrels of oil can be extracted when high prices arrive to warrant the higher cost. And let me comment that no one with any understanding of the methods by which oil is taken from the ground figures the date of exhaustion by a simple operation in arithmetic. There is neither rhyme nor reason in dividing any estimate of oil reserves by the present yearly output—in the very nature of things the oil cannot all be pumped out that fast. So it is that exhaustion of our oil wells must be a gradual process, accompanied by the more or less distressing symptom of rising prices, and these higher prices will bring to market the oil from the Government's oil-shale deposits. But before that time there are many more millions of barrels of oil to come from wells on Government land.

"Our coal, however, furnishes the greatest assurance of the nation's future prosperity, and so it is more than a matter of passing human interest that the estimated quantity of coal in Government ownership here in the United States exceeds the total tonnage of all coal in the British Isles, as estimated by Britain's most eminent authority.

"We honor the foresight and thrift of the father who plans and provides for the future welfare of his children—no less should we commend and endorse the policy of practical conservation in the handling of our country's large estate. Twenty years of close contact with this problem has convinced me that the public interest can be best served by private initiative in the operation of these great holdings of mineral fuels, together with the supplementary water power, but the long look ahead of Uncle Sam himself is needed to guide the private operator. Such safeguarding of the future America is paternalism of the right sort."

In a recent address before the Mining and Metallurgical Society of America, **James R. Finlay**, well-known mining engineer, presented some interesting facts in regard to the future price of lead. With particular reference to the Coeur d'Alene District in Idaho, Mr. Finlay said:

"Take for example a lead district such as the Coeur d'Alene in Idaho, able to produce 100,000 tons a year besides perhaps 6,000,000 ounces of silver. At present prices such an output would have a gross value of about $22,000,000. At an average of 30 percent profit which was about what the copper mines could figure on, the dividends would be about $6,600,000 a year. On such a prospect I do not think many would feel like investing over $33,000,000 and waiting ten years for results. The difficulty of proving that the district would be worth such a venture would be great. Five or six good veins are scattered over a length of 20 miles; only three showed pay ore at the surface, none of these in such quantities as would have impressed a man who thought of returns on $33,000,000. If they were in the Sahara I do not think he would decide to explore them. One does not put in $33,000,000 and 10 years of anxiety on a guess; he wants to know what the showings will lead to. In this particular case the amount of work and time required to indicate, I do not say demonstrate, that these veins could be depended on for, say, 10,000,000 tons of ore would in itself be no contemptible undertaking in terms of finance. We must remember that many good looking and big looking lead deposits have proved deceptive. One would feel like guarding against that. We might follow the argument out with regard to most, if not all other types of deposit and probably come to the same result—pioneering will require ten years at least to modify the situation."

NIAGARA IN POLITICS

"NIAGARA in Politics," by Dr. James Mavor, late professor emeritus of political economy in the University of Toronto, and published by E. P. Dutton & Co., is a refutation of the arguments earlier put forth, and receiving wide publicity, by Carl D. Thompson on "Public Ownership."

Dr. Mavor traces the early history of the Ontario power movement, and states that it legislated itself outside of the law, frightened new capital from private enterprises, which it then acquired at panic prices, and plunged Canada into an enormous debt.

By giving individual service at ludicrously low rates, in order to induce favorable action at the polls in thickly settled areas, and attempting to recoup its losses by a high rate to industry, a condition of economic stagnation was created, according to the author, on the Canadian side of the Falls, while the vigorous industrial development on the American side is obvious. The exemption from taxation of the hydro-electric operations has resulted in loss to the taxpayers far greater than the saving in power bills.

Failure to provide adequate sinking funds for the bonded indebtedness which was supposed to be retired in 30 years, is predicated by the fact that so far, less than 2 percent of the advances made on account of the municipalities have been provided for by sinking funds.

Dr. Mavor states that even where gross injustice has been perpetrated, in trespass or damages, there is no redress, the courts being closed to any litigation against the commission by special legislation.

The whole book is a startling exposè of the Government in business.

A Crabtree Memorial Fund is being founded by his former students in memory of the late Prof. Frederick Crabtree, who at the time of his death on February 14, 1925, was head of the Department of Mining and Metallurgical Engineering at Carnegie Institute of Technology, according to an announcement from the institution.

The proceeds of the memorial will be used to establish yearly mining and metallurgy scholarships which will be awarded to Carnegie students. The fund is being raised entirely through the activities of the alumni of the Department of Mining and Metallurgical Engineering, it is planned to award the first scholarship next year.

NEWS OF THE MINING FIELD

A Résumé Of The Activities Of The Mining Industry And Items Of Interest In The Field

Miami Copper's Ability to Make Profit on Lower Grade Ores Will Increase Tonnage

Miami Copper Company, producing slightly over 5,000,000 pounds of copper a month, has been able to make copper at slightly under 12 cents a pound.

An official of the company, amplifying this statement, said: "Since October Miami Copper Company has operated on low-grade ore exclusively. The average cost for the first two months of October and November on the treatment of about 600,000 tons of ore, yielding about 14 pounds of copper a ton, has been 11.92 a pound. It is anticipated that the cost after the first day of January, with slightly increased smelting charges, will be 12 cents or a little over 12 cents a pound. This comes well within the 12.50-cent cost predicted in the annual report.

"Because of Miami's ability to make a profit on ore of even a lower grade than anticipated, it is believed that the tonnage capable of treatment will be materially increased over the estimate of 36,000,000 tons given in the annual report."

Clark Interests File $6,000,000 Suit Against Anaconda

The W. A. Clark interests, represented by the Moulton Mining Co., the Clark-Montana Realty Co., and the Elm Orlu Mining Co., operating in Montana, and J. Ross Clark of Los Angeles, Calif., have filed complaint against the Anaconda Copper Mining Company in the Federal court at Butte, alleging that the Anaconda Company has extracted some $6,000,000 of ore from its Badger and State veins. They claim that the apex of these veins lies in their Poser and Intermediate veins. An accounting is asked on ores already alleged to have been extracted in the disputed ground and also for an order restraining the extraction of ore during the pendency of the suit and that at its conclusion the Anaconda Company be perpetually enjoined in either of the veins or lodes in question.

Montana Mines Pay $400,000 Taxes Under Protest

Montana metal mining companies have paid for this year to the state about $400,000 in metal mines tax, in conformity with the metal mines tax law, approved by popular vote at the 1924 general election. Nearly the entire amount was paid under protest, the companies having sixty days to enter suit attacking the law. Anaconda Copper Mining Co. paid $286,056; Butte & Superior, $37,773; Elm Orlu Mining Co., $25,838; Butte Copper & Zinc, $13,106; and the Anselmo Mining Co., $5,058.

Underground Workings Now Connect Burke and Mullan, Idaho, Four and a Half Miles Apart

The towns of Burke and Mullan in the Coeur d'Alenes, four and a half miles apart, with high mountains between them, are now connected by an underground passage, drills having broken through from the long deep workings of the Star crosscut recently into the old workings of the Morning mine. This is the culmination of years of work which the Hecla Mining Company, developing the Star vein, has brought to a successful conclusion.

The crosscut has opened, explored and developed the famous Star vein at great depth. The work has steadily progressed toward the Morning mine workings and the compressor which for months has been thundering away in the face of the crosscut, shot the drill through into an opening and the long tunnel was found to have reached into the stopes of the Morning. The tunnel way between the two mines is on the 2,000-foot level below the surface plant of the Hecla mine at Burke.

Change in Tramway Plans Said to Indicate Construction of Smelter in Coeur D'Alenes

An important change has been made in the plans of the Bunker Hill & Sullivan Mining Company for the construction of the tramway to the Sydney mine. Instead of bringing the lower terminus of the tram to the Star mill as first intended, it has been decided to bring it to the old Sweeny mill and remodel one unit of this plant to handle the zinc-lead ores of Pine Creek. This is considered as another step indicating that the Bunker Hill company still plans to build the zinc smelter to handle Coeur d'Alene ores, costing approximately $1,000,000.

The old Sweeny mill for several years has been used by Bunker Hill to handle ores of leasers in the Wardner-Kellogg district. Part of it will continue to concentrate these ores, while one unit is remodeled for zinc ores.

United Verde Copper Company to Build Large Milling Plant and $250,000 Hospital

Active construction work on the new mill of the United Verde Copper Co., which will be located close to the present crushing plant at Clarkdale, Ariz., will begin just as soon as the plans are finally completed and tenders can be called for. The first unit will have a capacity of 1,000 tons per day, and the great low-grade ore bodies in the mine, the copper content of which is too small to permit of profitable smelting, will be developed and worked, adding largely to the gross output of the property and furnishing employment to many additional men.

Plans for a $250,000 hospital, to be erected by the United Verde Copper Company, at Jerome, Ariz., have been practically completed. The new building will be a three-story one, with basement and roof garden. It will be of concrete construction and will cover a ground area of 56 by 150 feet. It is hoped to start construction during January.

Phelps Dodge Safety Endeavors Showing Results

Since the organization of the Phelps Dodge Safety Committee there has been a marked decrease in the number of accidents at the various plants of the Phelps Dodge Corp. in Arizona, and it is reported that through the cooperation of both company officials and workmen new methods, suggestions and ideas are constantly being brought forth, which has resulted in a greater interest and effort to cut down the accident toll. Competition between the various branches to keep down the accident rate is part of the safety program, and the record at present is as follows: Moctezuma Copper Company, first; Copper Queen branch, second; Old Dominion Company, third; Morenci branch, fourth.

Officials of the Corporation met on December 1 at the Old Dominion Company, Globe, Ariz., to discuss ways and means of further reducing the hazards

of the mining industry. This was the third such meeting held since the first of the year.

The safety committee is composed of the chairmen of the various branch committees, of which P. G. Beckett, vice-president and general manager of the Phelps Dodge Corp., is chairman. At each branch, aside from the branch safety committee, a safety committee composed of both bosses and workmen in each department also functions.

Merger of Lead and Zinc Interests

Lead and zinc properties in the Joplin district valued at approximately $2,500,000 are involved in a consolidation effective January 1. The Underwriters Land Company, sixth largest producer in the field, is merged with the Consolidated Lead & Zinc Company, and the Consolidated company will be further enlarged later if options on additional mines and royalty interests, valued at $2,500,000 are exercised. Options are held by the Consolidated company on mines of the Tulsa-Quapaw Mining & Investment Company, Domada Mining Company and the Baby Jim Mining Company. The company also has options on royalty interests of the Wright Mining & Royalty Company and the Tulsa-Quapaw Company.

Zinc Export Association

E. V. Gent has been appointed manager of the Zinc Export Association, Inc., and offices have been opened at 61 Broadway, New York City. The association was organized in November to handle the export sales of a large number of American producers. Marshall Bros. & Co., of London, have been named as its sole European selling agents.

Anna-Beaver Lead-Zinc Mine Sold for $1,420,000

The Anna Beaver Mines Company, Cardin, Okla., subsidiary of the Metals Exploration Company, has been sold to Harry Payne Whitney of New York. The purchase price is said to have been $1,420,000, and represents one of the largest transactions in the history of the Tri-State zinc district. Whitney, a large stockholder in the Metals Exploration Company, is said to have purchased the entire stock of the Anna Beaver Mines Company. This mine was the largest asset of the Metals Exploration Company.

The mine is one of the largest producers in the Tri-State district. It was reopened in 1923 following a long shutdown and during 1923 and 1924 earned enough to pay off outstanding liabilities of $800,000.

Excessive Sulphur in Michigan Iron Threatens Mining—Funds Sought For Investigations

Michigan mining companies are planning to raise a fund of $3,000 to aid state mining engineers and the University of Michigan in their research study of the excessive amount of sulphur in the form of gypsum which is threatening to close many large iron mines near Crystal Falls and Negaunee.

L. P. Barrett, state mining geologist, Harold Davidson of Ironwood, state mining engineer, and Professors A. H. White and George Brown of the University of Michigan, are now carrying on a study to determine a remedy for the trouble.

While there is a vast amount of high grade iron ore in the Michigan mines, many of the larger ones, after years of development, are running into the sulphur trouble and facing large losses. Iron ore which has a sulphur content of more than 1 percent is unsuited for the steel industry, and some mines near Negaunee and Crystal Falls have high content iron ore containing as much as 5 percent sulphur.

Lake Superior Iron Ore Shipments

With 7,217 tons of Lake Superior iron ore shipped down the lakes in December, the season's total of lake movement is 54,081,297 tons, or 27 percent over 1924 and 8 percent under 1923. This year's movement bears the same percentage relation to the year's pig iron production as the average of the past six years.

Skilling's Mining Review prints some interesting lines about estimates made before the season opened:

Estimating the iron ore shipments from the Lake Superior district for each succeeding season is indulged in all along the line from the mines to the furnaces. Now that they are making estimates of the iron-ore shipments for 1926, it will do no harm to investigate some of the forecasts for the season of 1925. F. J. Gavin, general superintendent of the Great Northern Railway, made a good estimate in January, 1925, only a few weeks after the close of the 1924 season. His estimate was 55,000,000 gross tons, and was published in the Mining Review of January 31.

Herman C. Strom, traffic director of the Pittsburgh Steamship Co. of Cleveland, early in September, estimated the total ore movement for the lake shipping season at 54,000,000 gross tons, a remarkably close estimate.

John W. Woodfill, vessel transportation agent for the Hanna fleet, has a minimum and maximum estimate on his desk calendar, under an April, 1925, date. The minimum was 52,500,000 and the maximum 53,000,000.

Iron Mines Carry On Extensive Underground Work During Winter

The Oliver Iron Mining Company and the independents in Minnesota are to carry through substantial programs of stockpiling at the underground mines during the winter. Work will be especially active on the Vermillion range. The Pioneer mine there, the largest underground mine in the state, will maintain a full crew. At the Soudan, another Oliver mine at Tower, a large stockpile will be accumulated before the lakes are open to navigation.

Full crews will be employed by the Oliver and the independents at mines in the Hibbing and Virginia districts, and it is thought that mining conditions in the Lake Superior district will be better than in several years.

Would Free Gold Mines From Tax

The Sacramento Department of Mines and Mining has initiated a campaign through California congressional representatives to have the income tax removed from gold mines. The department will also aid the California Debris Commission in its endeavor to obtain a $50,000 appropriation from the War Department to make needed flood control and debris surveys of the Sacramento and its tributaries, such data to be used in furthering the erection of hydraulic debris dams. The department is considering the publication of a booklet containing information of California's metallic and non-metallic minerals.

Places World's Aluminum Output, 1925, at 200,000 Tons

Preliminary statistics indicate that the world production of aluminum is at about the highest level so far reached, according to Dr. Robert J. Anderson, consulting metallurgical engineer and expert on aluminum. The United States accounts for more than 50 percent of the world output. The output for 1925 may approximate 400,000,000 pounds, says Dr. Anderson, including over 200,000,000 pounds in the United States, with Norway second, Switzerland third, and France fourth. The world production of aluminum has increased about 100 percent every five-year period over the previous five years since 1900, and the metal is expected to stand second to copper by 1935 or 1940.

Tonnage of Smokeless Fields of W. Va. For 1925 is Largest Ever Produced

Figures released by the Winding Gulf Operators Association, of Beckley, W. Va., indicate that the four smokeless districts of Southern West Virginia will produce around 45 million tons of coal for the year 1925. This will be the largest tonnage ever produced by the

smokeless operators in any one year. In 1916 these fields mined and shipped 36 million tons and in 1924, 38 million tons, but the production this year bids fair to exceed by seven million tons the figures of last year.

The October tonnage of the Pocahontas, New River, Winding Gulf, and Tug River districts, shows a production of 4,511, 344 net tons, a gain of 430,051 net tons over October, 1924. The total figures up to November 1 shows a production of 37,518,307 net tons, a gain over the same period last year of 5,799,230 tons. It is estimated that production for November, which was heavy and production for December, which held up well the first half of that month, will swell these figures to 45 million tons.

"It is safe to say, states the Winding Gulf Association bulletin, that when the smokeless operators of West Virginia balance their books for 1925, many ledger accounts will be in 'the red,' indicating a whole year's work and effort and the depletion on their property gone for nothing, save the unsatiable desire to build up a larger and yet a larger tonnage each month at the expense of the cash reserves and the mineral resources of their property. It is quite safe to consider that if the smokeless operators of West Virginia had been willing to have dug and shipped their coal according to the legitimate demands of trade and instead of producing a tonnage of 45 million tons, produced a tonnage of 30 million tons, that they would have had the 15 million tons of the most valuable coal in the world left in the mountains for future use and instead of showing gross losses, they would have been able to have made a fair return to their stockholders on their investment."

Smokeless Operators Elect Officers

At the annual meeting of the Smokeless Coal Operators' Association of West Virginia, held in Washington, December 9, W. D. Ord, of the Empire Coal & Coke Co., was reelected president; Major L. Rodman Page, Jr., of the Crozer-Pocahontas Co., was elected first vice-president, succeeding William C. Atwater; Major W. P. Tams, Jr., of the Gulf Smokeless Coal Co., was reelected second president; G. H. Caperton, of the New River Coal Co., treasurer; and E. J. McVann, secretary.

E. E. White Resigns as President of Winding Gulf Operators—P. M. Snyder Elected

At the seventeenth annual meeting of the Winding Gulf Operators' Association held in Washington, E. E. White, who has been president of the association for 17 consecutive years, tendered his resignation and retired from active duties in the Winding Gulf field. This was occasioned by Mr. White disposing of his holdings in that district to the Massachusetts Coke & Gas Co. and temporarily, at least, severing his connections with West Virginia smokeless coals and giving closer attention to his banking and mining interests in the anthracite fields of Pennsylvania.

The association elected P. M. Snyder, of Mt. Hope, W. Va., as president; W. Gaston Caperton, of Slab Fork, vice-president; George Wolfe, of Beckley, secretary; and A. W. Laing, of McAlpin, as treasurer. The following were elected to serve on the executive committee: A. W. Laing, C. H. Mead, L. Epperly, W. B. Beale, and T. H. Wickham.

Coal Men on West Virginia Tax Commission

Governor Howard M. Gore, of West Virginia, in announcing the personnel of the newly appointed tax commission of that State, authorized by the legislature last spring, named J. E. Jones, vice-president of the Pocahontas Fuel Co.; V. L. Highland, Republican National Committeeman from West Virginia, nominally a banker, and also extensively interested in mining properties; E. H. Elkins, actively engaged in the coal business for several years as head of the Randolph Colliery Co.

Tennessee Coal, Iron & Railway Co., Improvements

The Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., through its president, George Gordon Crawford, has announced an extensive program of new construction which will be undertaken by this corporation. All the new works and additions will be provided in the Fairfield division. Included in the program are four 140-ton open hearth furnaces, or double the present capacity of this plant, additional heating furnaces and strippers for the blooming mills, two new blast furnaces of 600-ton capacity, 77 oven battery addition to coke works, which now consist of 434 by-product ovens, and provision for the delivery of coke from the coke plant to the blast furnaces by means of a transmission belt. A central power station will also be constructed to furnish electrical energy for the various works, the gas from the coke plant being utilized for steam-making purposes.

No estimate is given of the cost of these improvements, but it is said that the total expenditures will probably run from $10,000,000 to $15,000,000. Although no mention is made of contemplated developments in the coal mining division, the greatly increased coke-making facilities and coke requirements for the additional furnaces will naturally call for a further stimulation in coal production.

Consolidation in W. Va., Ky., and Va. Involves Fourteen Coal Companies

A charter has been granted to the Wakenva Coal Co., which represents a consolidation of fourteen coal mining companies in West Virginia, Kentucky and Virginia, with a combined output of 1,500,000 tons annually. It is expected that the output will be increased to 2,500,000 tons, which will make the company one of the most important in the Southern fields. The total capitalization is $9,750,000.

S. R. Jennings, Johnson City, Tenn., is president of the new organization, and A. S. Higginbotham, Tazewell, Va., vice-president. The Board of Directors includes C. Bascom Slemp, former secretary to President Coolidge, chairman, S. R. Jennings, Jas. W. Gerow, A. K. Morison, E. R. Boyd, A. S. Higginbotham, Ferdinand Powell and other prominent business men.

The companies included in the merger are the Beaver Creek Coal Co., Camp Branch Coal Corp., Floyd-Elkhorn Consolidated Collieries, Garden Coal Corp., Hazard-Blue Grass Coal Corp., Hill Creek Coal Co., Kennedy Coal Corp., Kroll-Litz Coal Co., Lewis Creek-Banner Co., Nora Coal Corp., Sandy Ridge Coal Co., Upper Banner Coal Corp., Virginia-Banner Coal Corp., and Walkers Branch Mining Co.

Seek Machine Agreement

A subcommittee comprised of four representatives of the Illinois Coal Operators' Association and four from the Illinois district of the United Mine Workers held several meetings in Springfield in December for consideration of wage scales in connection with the operation of modern mining machinery.

The subcommittee meetings followed a conference of the joint committee held in Chicago, at which the ultimatum of the union against the further installation of loading machines until a wage scale is fixed was discussed, and where the talks served to clarify the positions of both operators and miners. In general, it is the attitude of the operators that the machines are still a matter of experiment and that there is no basis upon which to fix wage scales, while the miners believe that wage scales could be fixed on tonnage bases. It is expected that several more meetings will be held before the question is definitely settled.

Gulf States Steel Acquires 36,000 Acres of Alabama Coal Lands

Coal holdings totaling 36,000 acres in Tuscaloosa County, Ala., near Lock 17, on the Warrior River, formerly belonging to the Friedman interests, have been sold to the Gulf States Steel Co., it is announced, and it is understood that the

property will be developed in the near future. The Gulf States Steel Co. operates coal mines in Jefferson and Blount Counties, with a large steel mill, furnaces and by-product oven plant located at Gadsden.

W. A. Brewerton Buys Southern Gem at Auction

W. A. Brewerton, of the Brewerton Coal Co., Lincoln, Ill., has purchased at public auction the stock and property of the Southern Gem Coal Co. The purchase price was $100,000, and the auction was ordered by Federal Judge George W. English. The property includes mines at West Frankfort and Pinckneyville, and the purchaser assumed all outstanding obligations of the concern, including $42,000 interest on bonds, $91,000 taxes in Franklin County, $52,000 in pay rolls at West Frankfort, $16,000 in pay rolls at Sesser, and $18,000 in pay rolls at Royalton.

Chamber of Commerce Disapproves of Pinchot Plan

Opposition to the proposal put forward by Governor Pinchot in the anthracite coal strike on the grounds that it did not "propose that all controversial issues should be arbitrated" was expressed in a resolution adopted at a meeting of the board of directors of the Chamber of Commerce of the United States. The resolution reads:

"Arbitration as a means of adjusting the present strike in the anthracite field has taken an added importance because of the proposal of Governor Pinchot.

"An examination of his proposal shows that it did not propose that all controversial issues should be arbitrated. On the other hand, the operators offered arbitration of all issues involved in the controversy.

"While it is not the purpose of the board to define any plan of arbitration, it is its judgment that any plan to be of lasting benefit to the industry and in the public interest should consider the merits of the controversy in all of its aspects."

Pittsburgh Coal Withdrawals from Producers' Association

Withdrawal of the Pittsburgh Coal Co. from the Pittsburgh Coal Producers' Association is attributed to the company's resuming operations in five of its mines in the district under the 1917 scale. One of the functions of the association was to make wage agreements with the United Mine Workers of America, and the association was named as the principle in these contracts and not the individual companies. The number of mines reporting to the association is reduced from 75 to 43 by the resignation of the Pittsburgh Coal Co.

Miners Warned to Observe Precautions

Following an explosion December 2 in the Wilbert & Schrieb mine in the southeastern Kansas field, James Segerwood, state mine inspector, issued a warning to all miners of the district to observe safety precautions more closely. The inspector found the Wilbert & Schrieb explosion was the result of using too much powder, tamped with coal drillings, and recommended the discharge of two miners. "Shots must be tamped with clay or some noncombustible material," he warned. "Mines also must be kept properly sprinkled or rock dusted and cleaned." Two entries on the south side of the mine were badly damaged, with doors and stopings torn away. The north side of the mine, which had been rock dusted, was not disturbed.

First Aid and Mine Rescue Film

To promote first aid and mine rescue work in coal mining, the Peabody Coal Company has made the handsome donation of $5,000 to a film of three reels, which will be prepared and distributed under the direction of the U. S. Bureau of Mines. Officials of the Bureau will meet at Indianola, Tenn., within a short time with Thomas G. Fear, general superintendent of the Inland Collieries Company, who will assist in arranging for the proper settings. The underground scenes, covering mine rescue, will be filmed at Indianola and the first aid work will be taken in a Chicago studio.

Red River Oil Wells Turned Over to Operators

Government operation of the Red River oil field, bordering on Oklahoma and Texas, was discontinued November 30, when the Interior Department turned over the wells to the various oil and gas operators awarded leases in the recent adjustment of claims in the district. Concerns with the largest leases in the fields who took over the producing wells include the Burke Divide Oil Co., Inc., of Terre Haute, Ind., with 227 acres; the Melish Consolidated Placer Oil Mining Association of Oklahoma City, with 222 acres; and the Bell Oil & Gas Co., of Tulsa, with a lease of 122 acres.

Transfer of the operation of the Red River field to the Interior Department was made in July, 1924, from a receivership of the United States Supreme Court. Royalties received by the Government from the field have amounted to approximately $695,000. In addition the Government will receive a royalty on all oil and gas produced in the future.

Government Oil Shale Plant Nearing Completion

The Government shale plant being erected in Naval Oil Shale Reserve No. 1, near Rulison, Colo., is about 75 percent completed, according to a letter from John Desmond, engineer in charge, read before the meeting of the Rocky Mountain Association of Petroleum Geologists at Denver. The Pumpherston retort, purchased in Scotland, is being erected by an expert shale engineer from Edinburgh.

The 5,800-foot tram line will be built in the spring, and it is expected that the plant will be ready for preliminary runs before the end of June.

It was pointed out by Dean E. Winchester, president of the association, that the decision of the Government to install the Scottish equipment was for the purpose of providing a plant that had proved successful on shale treatment elsewhere, although of a type different from the Colorado shale, and that has been well developed mechanically through many years of use.

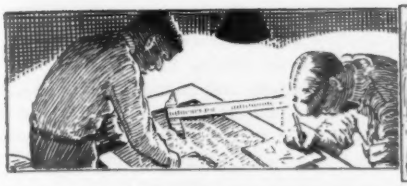
Rockefeller Pledges $250,000 for Petroleum Research

John D. Rockefeller has pledged a fund of $250,000 to the American Petroleum Institute "for the initiation of a program of scientific research in petroleum," according to an announcement of the institute. The fund is to be available in annual installments of $50,000 for five years and to be expended "primarily in supporting research fellowships in scientific institutions—the recipients of such fellowships to engage in research on some problem of the physics, chemistry of geology of petroleum oil," and the results of the work are to be made "freely available to the industry and public generally."

Mr. Rockefeller recommends that the fund be administered by a committee consisting of J. C. Donnell, Walter C. Teagle, and Robert L. Welch, all directors of the American Petroleum Institute. Mr. Donnell is president of the Ohio Oil Co., Mr. Teagle is president of the Standard Oil Co. of New Jersey, and Mr. Welch is general secretary and counsel of the institute.

States with Straight-Line Boundaries

Colorado and Wyoming are the only states in the Union having unbroken straight-line boundaries on all sides. Each covers the same number of degrees of latitude and longitude; namely, 4 of latitude and 7 of longitude, yet because of the convergence of the meridians toward the north the area of Wyoming is 6,034 square miles less than that of Colorado.



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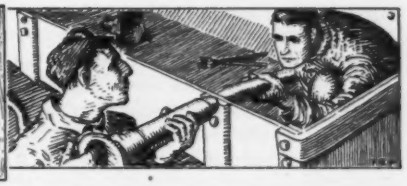

Foote Bros. Develop New Line of Right Angle Drive Spur Reducers

Most standard spur gear reducers as produced by a number of well known manufacturers are designed for what is known as "straight line drive." This means that the primary or driving shaft of the machine is concentric or has the same axis of revolution as the secondary on slow speed shaft. When these machines are connected with the driving motor, the shafts are consequently butted one against the other and joined by means of some sort of flexible coupling or universal joint to take up misalignments.

With this arrangement, the motor and speed reducer requires considerable space in a straight line from the end of the shaft on the driven machine. There are, however, some industrial applications for speed reducers where space is rather limited, such as where the driven machine is mounted alongside of a wall or the reduction unit must be mounted within, behind or on top of the machine.

The new line of IXL Right Angle Drive Spur Reducers recently developed by Foote Bros. are designed to meet the requirements for reduction gears that must operate in confined spaces where sufficient room is not available for the mounting of standard straight line drive units and where it is necessary to change the direction of the power drive.

The IXL Right Angle Drive Unit is very similar in appearance to the standard straight line drive speed reducer but that the high speed shaft projects at right angles to the axis of the slow speed shaft. The change in direction of the power drive is accomplished by means of bevel or mitre gears—mounted in the high speed end, the secondary bevel or mitre gear being mounted on the high speed driving shaft which is concentric with the slow speed shaft.

Except for the addition of the bevel gears in the high speed end, the design of the machine is identical with the standard IXL Non-Planetary Spur Gear Speed Reducer. The high speed pinion being integral with the high speed shaft and delivering the power through three idler gears set at 120 degree angles to a large rotating integral gear. The internal gear is securely fastened to the slow speed shaft. The high speed pinion, together with the idlers, internal gear and slow speed shaft, comprise the entire mechanism for a single reduction train which can be repeated in securing greater reduction ratios.

By changing the size of the pinion and internal gear and the relative size of the bevel gears in the high speed end, almost any desired relation may be obtained between the speeds of the high speed and low speed shafts.

The manufacturers produce these right angle spur reducers in a large variety of standard sizes and reduction ratios, horsepowers ranging up to 150 H. P. and reduction ratios up to 350 to 1.

Bucyrus 120-B To Replace the Railroad-Type Shovel in Mine and Quarry

Railroad-type shovels, long the most adequate digging tool in ore and rock, have always had certain inherent shortcomings, which resulted in the frequent installation of small revolving shovels on work which was unquestionably beyond their capacity. The railroad-type shovel lacked mobility. It worked very close to the bank and its digging and dumping radius was limited. On the other hand, the revolving shovel lacked the strength, power and capacity of the railroad-type.

The Bucyrus 120-B is built to combine the advantages of both the railroad-type and the full revolving shovel. This new shovel combines five qualities never heretofore found on one machine.

1. The speed of action of the railroad-type shovel.
2. The mobility of single truck caterpillars.
3. The full revolving swing.
4. Big dipper capacity, four yards.
5. Ruggedness and power greater even than the railroad-type shovel.

The machine has a dumping height of 20 feet. Its dumping radius is 36 feet. The boom is 29 feet long and the rear end radius is 17 feet. The machine is designed and built with one idea constantly in mind, that of building a machine which would be as free from interruptions in operation as it was possible to build. To this end all parts are made with a ruggedness much greater than in shovels formerly built.

The machine is planned from beginning with the thought of efficient operation and the steam machine includes features which are entirely new in steam shovel design, such as fire brick arch and superheater as standard equipment. The electric machine is equipped with Ward-Leonard direct current, generator field control. It has been possible in the design of this machine to eliminate the necessity for compressed air on the machine.

New 4-Ton Gasoline Locomotive Employs Fordson Power Plant

A new 4-ton gasoline locomotive, incorporating the Fordson engine and transmission parts, was recently announced by the Davenport Locomotive Works, Davenport, Iowa.

The proven all-round dependability of the Fordson power plant with the advantages of using highly standardized engine and transmission parts for quick replacement and repair recommend its incorporation in this latest addition to the Davenport line.

The design of the locomotive is very simple and accessible, and the rugged, balanced construction found in the larger Davenports has been duplicated.

The design is flexible, allowing the use of a canopy cab, a fully enclosed steel cab, or the removal of the cab altogether. The operating levers are placed within easy reach at the right-hand side of the cab, and clear vision is provided in all directions.

The locomotive has a speed range of 3 to 14 miles per hour and a maximum tractive power of 2,125 pounds. Its operation is highly economical—starting on gasoline and running on kerosene.

This 4-ton locomotive completes the Davenport line of 4 to 20 ton gasoline locomotives.

Mechanical Drive Turbine

The type D-54 mechanical drive turbine, intended for the driving of centrifugal pumps, blowers, and other classes of mechanical drive, is described in Bulletin GEA-197, just issued by the General Electric Company, Schenectady, N. Y. The turbine is described and a sectional view shown.

Welded 1,650 Feet Underground

Being accustomed to rely upon their own resources for nearly everything, especially when the repair of equipment of the production of special apparatus is concerned, it is not surprising that mining men generally have accepted the oxy-acetylene process of welding and

cutting as dependable insurance against delay and shut down. Repair of heavy equipment is an old story to them; the matter of days or even weeks saved by welding an important casting is now relatively commonplace. Saving hundreds of dollars through repairing a piece of equipment that might otherwise go to the scrap pile is now looked upon as an ordinary incident in mine operation.

The oxwelding process, however, is also adapted to construction of special equipment. It is often said that with welding and cutting equipment the welding operator can work with metals just as a carpenter works with wood; cutting here and joining there as building of the part demands. Light, easily portable, this appartus can be used wherever a man can work.

Portability, adaptability to unusual purposes and convenience of oxwelding were strikingly demonstrated recently at a mine in Arizona.

Here a spring of pure water was found on the 1,300 foot level. Unlike most mine water, it contained no minerals which rendered it unfit for use; it analyzed pure enough to be used even as drinking water. For this purpose and for use with various machines, it was desired to run the spring water into a tank.

The best location was in a drift from the main tunnel on the 1,650 foot level. By blasting out the drift at the end, and by running a raise up for a few feet, a room for the tank was made. The tank was to be of 1,600 gallon capacity, 6 feet on each side, built of ¼ inch boiler plate.

A tank of this size and weight could not be built on the surface and lowered underground—the shaft wasn't big enough. It was therefore necessary, if the tank were to be had at all, to build it in place.

A riveted tank was out of the question; there wasn't room to work outside and inside at the same time. The mine used oxy-acetylene welding and cutting extensively in both their surface and underground operations, so it was promptly decided to oxweld the tank underground.

A platform was first built in place. Boiler-plate sections were cut to size and prepared for welding in the boiler shop on the surface, and were lowered to the 1,650 foot level. Here they were put into position on the platform and welded. In order to make the welding as convenient as possible under the cramped conditions (there was a clearance of only 1½ feet between the side walls of the tank and the drift), the tank was arranged so that it could be swung around in various positions to give the welder as much room to work in as possible. Welding was not a very comfortable job, as on this level the normal temperature is 122° F.

It took three 8-hour shifts for one welder and helper to do the work. When the tank was completed it was found to be tight in every seam and perfectly square. In addition to the seams, all nipples and pipe connections in the pipe were welded. The entire cost was about $150.

A two-inch hole was drilled with a diamond drill from the spring on the 1,300 foot level to the tank, and a pipe was run to the tank from the spring.

The building of this tank illustrates in a striking manner both the resourcefulness of the mine management and the adaptability of oxwelding equipment to unusual conditions. (Written by J. J. Bruton, Oxweld Acetylene Company.)

Philadelphia Electric Gets Huge Variable-Voltage Transformers

The last of the six huge variable-voltage transformers designed and manufactured for the Philadelphia Electric Company was delivered recently by the Westinghouse Electric and Manufacturing Company. There were six single-phase 20,000-KVA oil immersed, 60-cycle transformers in all, to constitute two banks delivering 60,000 KVA of electrical energy to lines supplying power to the Public Service Corporation of Trenton, and the United Gas Improvement Company of Bristol, N. J.

The transformers supplied will operate Delta connected on the low-voltage side at 13,800 volts, delivering power on Star connection at from 69,000 to 76,000 volts. The variable delivery is made possible by four steps embodied in a tap changing device designed for changing voltage under full load without shutting off the power or interfering with the transmission system or circuit breakers.

The two sets constitute the largest transformer installations ever placed in operation which include tap changing under load conditions. The specially designed tap changing mechanism is mounted in a large enclosed steel housing at the top of the transformer tanks. They are off the ground and are entered through a door which would remain locked at all times to prevent the tap settings being molested by other than those in charge.

The transformer tanks are more than 15 feet in height, with an overall clearance, including platform and bushings, of 24 feet. The tanks measure 9 feet 5 inches in diameter.

The two transformer banks are being installed in the Richmond station of the Philadelphia Electric Company as part of the first two units of what will ultimately be eight 50,000-KVA generating and transmission units.

Michigan Copper and Brass Company, Detroit, manufacturers of copper, brass, and aluminum sheets, has awarded the Austin Company, engineers and builders, Cleveland and Detroit, a contract for an aluminum smelting building. This is the second recent addition for this rapidly growing Michigan company.

Chilean Mining Properties to Electrify Haulage Systems

The Andes Copper Company, at Potrerillos, Chile, and the Chile Exploration Company, at Chuquicamata, Chile, have just placed with the Westinghouse Electric and Manufacturing Co., 23 industrial electric locomotives for the purpose of inaugurating the electrification of the haulage systems at these two mining properties.

The order received from the Andes Copper Co. calls for eight 10-ton trolley type locomotives and two 15-ton battery type locomotives, all of these units having modern contactor control. The Chile Exploration Co. has ordered six 70-ton combination trolley and battery type locomotives, three 25-ton pusher type locomotives, including substation equipment and switch gear, and four small battery locomotives. All of these locomotives are to be built jointly by the Westinghouse Company and the Baldwin Locomotive Works.

The Chile Exploration Co. has been considering this electrification for several years, and the present equipment represents the initial step in this important installation. The complete electrification eventually will require some 50 additional 70-ton locomotives, these units to be used in moving cars of copper ore from the electric shovels at the mine to the mill and in general haulage around the plant. These large locomotives are the first ones of the combination type to be built with articulated or connected trucks, this construction hitherto used only on the powerful railroad locomotives. Power at 600 volts direct current is furnished to the locomotives by a third-rail system and when the locomotive reaches the end of the third rail the shoe used to collect the current is automatically picked up and the locomotive propelled by current drawn from the storage batteries it carries.

The smaller pusher locomotives are designed to run on a narrow gauge track alongside of the tracks upon which the ore cars are operated. An arm on the pusher locomotive may be swung behind a car on the adjacent track and the car "spotted" for unloading at any desired place. This does away with the necessity of moving an entire train of cars in order to move any particular car to a certain location.

These locomotives and the 70-ton type utilize duplicate equipment wherever possible.

The electric power for this haulage system at Chile Exploration Co. is generated by steam turbines and oil-fired boilers located at the seacoast at Tocopilla, 75 miles away, and transmitted to the mining property at 110,000 volts.

Both of these mines are the property of the Anaconda Copper Co. The Andes Copper Co., at Potrerillos, is a new development, while the Chile Exploration Co., at Chuquicamata, is an old established producer, and is one of the largest copper mines in the world.

Foote Bros. Exhibit at Power Show

Among the many interesting exhibits at the New York Power Show was a versatile display of speed reduction units by Foote Bros. Gear and Machine Company, of Chicago.

Besides their standard spur, and worm gear reducers, this company exhibited their new vertical worm gear reducer—vertical spur gear reducer and right angle drive spur gear reducer.

A combination unit was also shown consisting of a spur and worm gear speed reducer connected together by flexible couplings and driven by a one-quarter H. P. motor, all units being mounted on a single bed plate. The total reduction ratio was 3,600 to 1, the motor speed being 1,725 R. P. M., and that of the final drive .48 R. P. M. Reductions as high as 50,000 to 1 are secured by using combination units of this kind.

G. E. Makes Progress

The actual material output of the General Electric Company for the year 1925 was greater than any previous year, according to the announcement by John Liston in his review of the year's activities of the company. This does not mean a record year in total value of sales, although the year's figures are slightly above those of 1924, but indicates the extent of price reductions which have been put into effect since 1920. The volume of production of all classes of apparatus was maintained at a fairly uniform rate throughout the year.

Steam turbines of exceptional capacity were constructed; and high steam pressures and superheating were more generally adopted. Certain classes of transformers were also carried to new high-unit ratings, with corresponding increases in their switching equipment.

In transportation there was a further adoption of the economical oil-electric locomotive, a record-breaking cross-continental run by an oil-electric car, and an increased use of gas-electric buses for feeder service to railways. Efforts were continued to reduce the weight of city and suburban railway cars, and the development of a practically noiseless car of this type was undertaken.

The automatic control principle was utilized for larger machines in power plants and substations, and its use was further extended in railway, mining, and industrial power systems. Special control apparatus was designed for new applications of motor drive, and numerous ingenious relays were produced for actuating and protecting industrial control and automatic station equipment.

More powerful rectifier sets were developed for radio transmission, quartz crystal control of broadcasting frequency was introduced, and exhaustive experimental work was rendered possible by a station of exceptional power and unique equipment designed and constructed solely for radio investigation.

Research work revealed factors of fundamental importance in cable characteristics and made feasible the construction of cable conductors insulated for higher potentials. Testing transformer sets were constructed for the highest commercial-frequency voltages so far secured, and were utilized in a variety of investigations of which those on lightning arresters were especially valuable.

The field of usefulness of the high-frequency type of induction furnace was widened by achieving successful operation at considerably reduced frequencies. Industrial heating and the use of automatic welding machinery made further gains, while equipment for electric household refrigeration was produced and sold on an unexampled scale.

Street-lighting expansion exceeded even the phenomenal increases of previous years. The practical requirements of aviation lighting were met by the production of several classes of beacons, each designed for specific service and manufactured on a commercial basis. The benefits of the improvements and economies secured in incandescent lamp manufacture were shared with the general public through the medium of reduced prices.

The Year of 1925 with the Bucyrus Company

Any manufacturer of excavating machinery must be continually improving his product in both workmanship and design. It is, therefore, often a difficult task to single out the most outstanding achievements for a given time. The four following have been chosen by the Bucyrus Company, manufacturers of excavating machinery with plants at South Milwaukee, Wis., and Evansville, Ind., as among the most important of their accomplishments for the year 1925.

First. The announcement of a 4-yard full revolving shovel for quarry and mine service. This machine, designed for rock digging and called the 120-B, is claimed to be much more rugged than even the railroad-type shovel. It combines the speed of acton of the railroad-type shovel and its tremendous power, with the full circle swing, long reach and other advantages of the Whirley. The machine weighs approximately 140 tons and is built for either steam or electric power.

Second. Fourteen years ago, caterpillars were first applied to shovels and draglines. This year this company has applied a mounting of this type to one of its big Class 320 draglines, a machine weighing nearly 400 tons and equipped with a 8 cubic yard dipper.

Third. Electric shovels driven by three shunt motors with Ward-Leonard control have been introduced. The shunt motor with Ward-Leonard control has been used for some time on both the swing and hoist of electric shovels, but its application to the thrust is believed to be new.

Fourth. A dipper dredge even larger than those used in constructing the Panama Canal, is at present under construction. This huge dredge, although the dipper capacity is only 10 cubic yards (those at Panama were 15 yards), is probably the largest and most rugged machine of its kind ever built. This dredge is driven through electric motors by Diesel engines. The horsepower is 1,200. As far as is known, it is the only large dipper dredge to be driven by Diesel engines.

Joy Manufacturing Company, formerly Joy Machine Company, announce that at a recent reorganization the Joy Machine Company was taken over by the Joy Manufacturing Company of Franklin, Pa., who will continue the manufacture and sale of mechanical coal loaders.

All rights to coal loading and allied machines heretofore invented by Joseph F. Joy, of Pittsburgh, Pa., and of all subsisting patents covering such machines in the United States, Belgium, France, Great Britain, Austria, Australia, Canada, and Germany, together with all pending applications in said countries and the patents to be issued thereon, have become the sole property of the Joy Manufacturing Company.

All communications relative to rights in any of the said countries should be addressed to this company only.

Westinghouse Appoints E. A. Hurme Manager of Electric Furnace Section

Mr. E. A. Hurme has recently been appointed manager of the Electric Furnace Section of the Industrial Heating Section of the Westinghouse Electric and Manufacturing Company according

to an announcement made by E. D. Kilburn, vice-president and general sales manager. The rapid increase in the use of electricity for heating purposes has made necessary the division of the industrial heating section into three sections, Mr. Hurme being made head of the Electric Furnace Section. Mr. Hurme was formerly manager of the steel mill section of the industrial sales organization.

New Oxweld General Sales Manager

An announcement has been made by the Oxweld Acetylene Company, 30 East 42d Street, New York City, of the appointment of Mr. J. N. Walker as General Sales Manager. Mr. L. D. Burnett has been appointed Eastern Department Sales Manager to succeed Mr. Walker, and Mr. Z. T. Davis, Jr., is now filling Mr. Burnett's former assignment as Assistant Sales Manager, Eastern Department. Mr. Walker is well known in the oxy-acetylene industry, having served for many years in progressive advancement through the Oxweld sales organization.

George D. Kirkham, Sales Agent, American Steel and Wire Company to Retire December 31

Mr. Kirkham first came to the company as sales agent of the old Washburn & Moen Mfg. Co., Worcester, Mass., in 1886. This company was taken over by the American Steel & Wire Co. 27 years ago.

Expert in the intricacies of the fine wire products of the old company, Mr. Kirkham continued in those lines until 1902, when he was established as sales agent at Memphis, Tenn., handling both merchant trade and manufacturing lines and as such contacted a very wide range of purchasers throughout the South.

When Mr. Kirkham came to Memphis he identified himself with the principal local institutions, such as the old Business Men's Club, the Memphis Driving Club, Memphis Country Club, and the old Chickasaw Guards Club. In October, 1907, Mayor Malone appointed him on the Memphis reception committee which went up the Mississippi River to escort President Roosevelt into Memphis. Mr. Kirkham also took an active part in the entertainment of Woodrow Wilson, then president of Princeton University, who came to Memphis before becoming President of the United States to attend the Tennessee-Princeton Alumni Association. He has also been active in the Memphis Rotary Club.

Mr. Kirkham has a very wide circle of friends in the North. He is one of the oldest members of the Chicago Athletic Association.

Mr. Kirkham plans to spend most of his time in the South during the winter and will go to Biloxi, after that time, returning to join relatives at Chicago who are planning to motor through the western and Pacific coast states next summer and fall.

Mr. C. E. Phillips has been appointed representative in charge of Wilkes-Barre office of the Allis-Chalmers Mfg. Co. Mr. Phillips, who was formerly connected with the Philadelphia office of the company, succeeds Mr. Guy V. Woody.

Blasting Accessories

A comprehensively illustrated booklet of eighty pages, entitled "Blasting Accessories," has just been issued by E. I. du Pont de Nemours & Co., of Wilmington, Del. It gives complete and detailed data on the various accessories needed for firing charges of explosives, together with explanations of the best methods of using these accessories. It has been pointed out that accessories of the best grade cost very little in comparison with the explosives, the drilling of the holes and supervision of employes for the shot. It is therefore expensive to employ inferior firing agents, for their use always involves considerable wastage of explosives and may result in poor breakage or dangerous and costly misfires.

Users of explosives may have a copy of Blasting Accessories by addressing requests to the Advertising Department of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Oil Burner Bulletin Published

A 28-page bulletin, thoroughly covering the methods and procedure in oil burner testing wherever the burners are fired under boilers or in warm-air heating plants, has just been issued by the American Oil Burner Association, 350 Madison Avenue, New York, N. Y. The bulletin discusses such theoretical considerations as are needed for the practical application of the methods and procedure given, which apply for both industrial and domestic burners. One of the principal purposes of preparing the bulletin was to provide under one cover all the important tables and formulae needed in testing burners, so that those in charge of the test need not suffer the usual annoyance and loss of time due to having to use a number of handbooks or references.

Emphasis is laid on the heat-balance method of test for domestic burners. By this method, with simple apparatus and few observations, the operating efficiency of an oil burner can be learned quickly with a sufficient degree of accuracy for most purposes, the bulletin states. A chart for quick determination of losses in oil combustion which will prove particularly useful is included in this manual of testing. Copies may be secured from the Association Headquarters at 75 cents each, payment to accompany the order.

Electrical Drives for Power Plant Auxiliaries

Electrical Drives for Power Plant Auxiliaries, a very opportune subject, is the title of a circular, 7381, recently issued by the Industrial Department of the Westinghouse Electric and Manufacturing Company. This publication is of material value in assisting in the proper selection of auxiliary drive that will supply continuity of service. Auxiliary pumps, fans, and blowers, coal-handling equipment, pulverized fuel equipment, and motors and control are some of the interesting topics discussed in this circular, which is well illustrated.

Copies of Circular 7381 may be obtained from any of the District offices of the Westinghouse Company or from the Department of Publicity at East Pittsburgh, Pa.

General Electric Catalog

General Electric Catalog 6001B, superseding all previous catalogs issued by the company, with the exception of those dealing with railway, mine, and industrial supplies and merchandise products, is being distributed. The complete catalog is issued every two years.

The book is 2 inches thick, and contains more than 1,100 8 x 10½-inch pages. The illustrations total more than 3,200.

The catalog is thumb-indexed into 16 sections, as follows: Generation, wire and cable, distribution transformers, arresters, voltage regulators, switchboards and accessories, meters and instruments, motors, motor applications, industrial control, railway, lighting, industrial heating, miscellaneous, and indices. In the indices, products are classified both by subjects and by catalog numbers.

An industrial control catalogue has been issued by the **General Electric Company**, bearing the number GEA-257. This publication furnishes information on representative lines of industrial control manufactured by that company and includes a reprint of the industrial control section of the company's general catalogue; instructive matter on the care and operation of control devices; wiring diagrams of some standard controllers, push buttons and other accessories; reference tables; lists of publications, and other useful information. It has 160 pages, is 8 inches by 10½ inches in size and is bound in paper.

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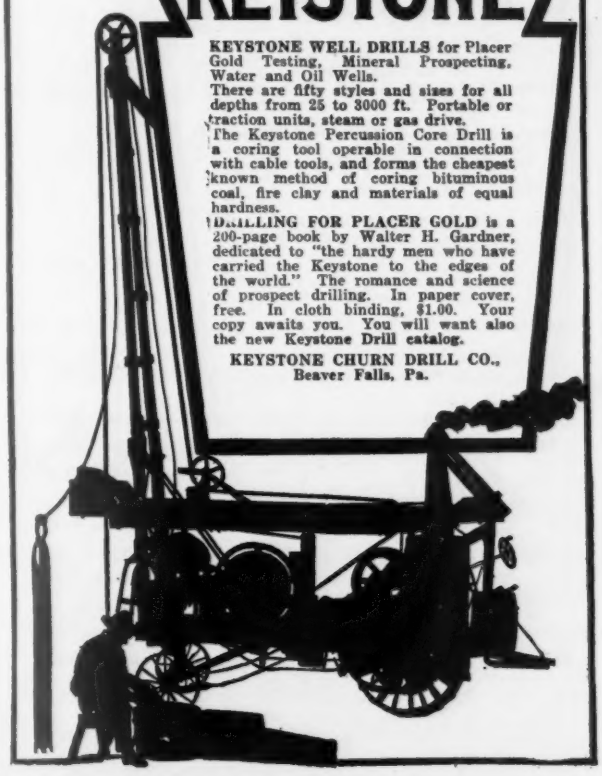

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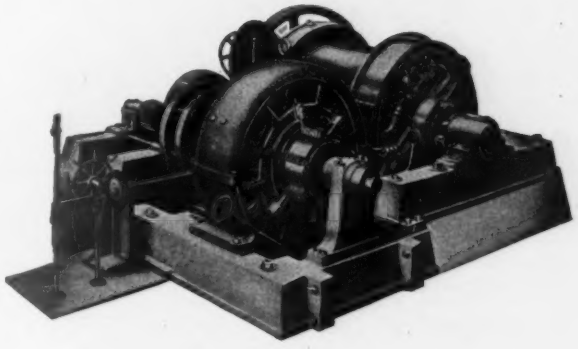

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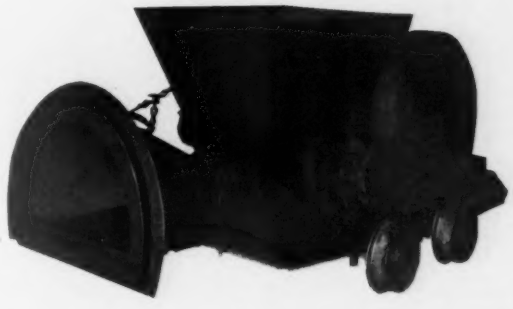

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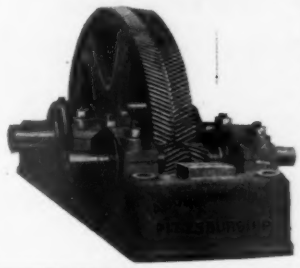

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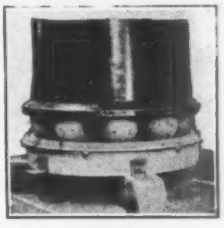

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Frank E. Cash, U. S. Bureau of Mines, 4800 Forbes St., Pittsburgh, Pa.
G. W. Hay, Gen'l Mgr., Consolidation Coal Co., Jenkins, Ky.
T. E. Jenkins, Vice-Pres., West Kentucky Coal Co., Sturgis, Ky.
J. F. Joy, Pres., Joy Machine Co., Franklin, Pa.
N. D. Levin, Jeffrey Mfg. Co., Columbus, O.
Rex Martin, Link-Belt Co., 910 S. Mich. Ave., Chicago, Ill.
N. H. McClevey, Vice-Pres. and Gen'l Mgr., Pike County Coal Corpn., Petersburg, Ind.
W. D. Turnbull, Genl. Engr. Dept., Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
William Whaley, Gen'l Mgr., Myers-Whaley Co., Knoxville, Tenn.

SECTION "B"—IN THICK AND THIN COAL, WITH VARYING ROOF CONDITIONS

E. K. Bowers, Ass't Treas., Morgan-Gardner Elec. Co., 2640 Shields Ave., Chicago, Ill.
Frank E. Cash, U. S. Bureau of Mines, 4800 Forbes St., Pittsburgh, Pa.
S. W. Farnham, Mng. Engr., Goodman Mfg. Co., Halsted St. and 48th Pl., Chicago, Ill.
Walter Stevens, Supt., Raleigh-Wyoming Coal Co., Glen Rogers, W. Va.
F. W. Whiteside, Chf. Engr., Victor-American Fuel Co., Denver, Colo.

SUB-COMMITTEE NO. 2—CONVEYORS

Newell G. Alford, Mng. Engr., Union Trust Bldg., Pittsburgh, Pa.
E. H. Coxe, Gen'l Mgr., Snowdon Coke Co., Brownsville, Pa.
T. W. Dawson, Cons. Engr., H. C. Frick Coke Co., Scottdale, Pa.
Chas. Gottschalk, Cons. Engr., 920 Citizens Bank Bldg., Evansville, Indiana.
E. F. Miller, Gen'l Supt., Bertha-Consumers Coal Co., Rachel, W. Va.
G. B. Southward, Chief Engr., West Virginia Coal and Coke Co., Elkins, W. Va.
D. A. Stout, Mgr., Fuel Dept., Colorado Fuel and Iron Co., Pueblo, Colorado.
F. G. Wilcox, Pres., West End Coal Co., Scranton, Pa.
J. D. Zook, Vice-Pres., Illinois Coal Corpn., 37 Van Buren St., Chicago, Ill.

SUB-COMMITTEE NO. 3—CUTTING MACHINES

Carl Scholz (Chairman), Vice-Pres., Raleigh-Wyoming Coal Co., Charleston, W. Va.
Walter Calverley, Pres., Fayette Coal Corpn., Farmers Bank Bldg., Pittsburgh, Pa.
A. P. Cameron, Gen'l Mgr., Westmoreland Coal Co., Irwin, Pa.
J. M. Clark, Vice-Pres., Clark & Krebs, Inc., Charleston, W. Va.
H. P. Dyer, Gen'l Mgr., Vandalia Coal Co., Sullivan, Ind.
G. T. Haldeman, U. S. Bureau of Mines, Washington, D. C.
Wm. E. Hamilton, Mgr., Hamilton Engineering Co., 310 Schultz Bldg., Columbus, O.
E. S. McKinlay, Pres., McKinlay Mining and Loading Machine Co., Point Pleasant, W. Va.
M. Mitchell, Sullivan Machinery Co., St. Louis, Mo.

Mine Drainage

I. A. Malady, *Chairman*

SUB-COMMITTEE NO. 1—PUMPS FOR DEVELOPMENT WORK

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E. F. Austin, Dravo-Doyle Co., Pittsburgh, Pa.
Herbert Axford, Sales Engr., Ingersoll-Rand Co., 610 Spruce St., Scranton, Pa.
Harold P. Dyer, Genl. Mgr., Vandalia Coal Co., Sullivan, Ind.
J. H. Edwards, Associate Editor, Coal Age, 2962 Winters Rd., Huntington, W. Va.
F. J. Emeny, Vice Pres., The Deming Co., Salem, Ohio.
J. E. Holveck, Dist. Mgr., Aldrich Pump Co., 1209 Empire Bldg., Pittsburgh, Pa.
G. E. Huttle, Mech. Engr., H. C. Frick Coke Co., Scottdale, Pa.
Chas. H. Matthews, Genl. Engr. in Chg. Mining Section, Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
H. J. Nelms, Genl. Supt., New Field By-Products Coal Co., North Bessemer, Pa.
J. S. O'Flaherty, Chf. Engr., Central Coal & Coke Co., Keith & Perry Bldg., Kansas City, Mo.
F. W. Smith, Hydroelectric Pump & Supply Co., Curry Bldg., Pittsburgh, Pa.

SUB-COMMITTEE NO. 2—PERMANENT PUMPING STATIONS

Parker Cott (*Chairman*), Salesman, Coal Mine Equipment Co., 2218 Farmers Bank Bldg., Pittsburgh, Pa.
Herbert Axford, Sales Engr., Ingersoll-Rand Co., 610 Spruce St., Scranton, Pa.
Henry E. Cole, Vice Pres., Harris Pump & Supply Co., 320 Second Ave., Pittsburgh, Pa.
J. P. Heidenreich, Asst. Genl. Mgr., Scranton Pump Co., Scranton, Pa.
W. L. Robison, Vice Pres., Youghiogheny & Ohio Coal Co., 1230 Hanna Bldg., Cleveland, O.
R. F. Roth, Emmons Coal Mining Co., Altoona, Pa.
Cecil W. Smith, Chf. Engr., Illinois Coal Corpn., 1380 Old Colony Bldg., Chicago, Ill.
M. Spillman, Works Engr., Worthington Pump & Machinery Corpn., Harrison, N. J.
L. D. Tracy, Supt., U. S. Bureau of Mines, 312 Ceramics Bldg., Urbana, Ill.

SUB-COMMITTEE NO. 3—NATURAL DRAINAGE

John Brunschwyler (*Chairman*), Div. Supt., Boomer Coal & Coke Co., Boomer, W. Va.
M. C. Benedict, Cons. Engr., Brown Equipment Co., 940 Ash St., Johnstown, Pa.
Oscar Cartlidge, Cons. Engr., 1593 Lee St., Charleston, W. Va.
L. P. Crecelius, Engr., Cleveland & Western Coal Co., 1517 Union Trust Bldg., Cleveland, Ohio.
E. D. Knight, 2207 Washington St., Charleston, W. Va.
R. Y. Wert, Supt., Durham Coal & Iron Co., Soddy, Tenn.

SUB-COMMITTEE NO. 4—UNWATERING ABANDONED WORKINGS

Prof. John W. Hallock (*Chairman*), Head of Department of Industrial Engineering, University of Pittsburgh, Pittsburgh, Pa.
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J. A. Malady, Master Mech. & Elec. Engr., Hillman Coal & Coke Co., Pittsburgh, Pa.
O. M. Pruitt, Pres., Indiana Air Pump Co., Indiana Pythian Bldg., Indianapolis, Ind.
Chas. A. Straw, Cons. Mech. Engr., Hudson Coal Co., 434 Wyoming Ave., Scranton, Pa.
G. V. Woody, Mgr., Allis-Chalmers Mfg. Co., Wilkes-Barre, Pa.

SUB-COMMITTEE NO. 5—MINE WATER AND ITS ACTION UPON MINE DRAINAGE EQUIPMENT

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M. L. Bettcher, Production Engr., The Duriron Co., Inc., Dayton, Ohio.
J. R. Campbell, Hudson Coal Co., Scranton, Pa.
Geo. Watkin Evans, Cons. Coal Mng. Engr., L. C. Smith Bldg., Seattle, Wash.
Carl J. Fletcher, Vice Pres., Knox Coal Mng. Co., Merchants Bank Bldg., Indianapolis, Ind.
C. L. Harrod, Elec. Engr., Indiana Coal Oprs. Power Assn., 1509 Merchants Bank Bldg., Indianapolis, Ind.
Marun J. Lide, Cons. Engr., Woodward Bldg., Birmingham, Ala.
Frank G. Morris, Genl. Supt. of Mines, Republic Iron & Steel Co., Sayreton, Ala.
L. D. Rover, Power & Construction Dept., Ford Motor Co., Detroit, Mich.
W. H. Waddington, Sales Engr., Driver-Harris Co., Harrison, N. J.

Mine Ventilation

C. H. Trik, *Chairman*

SUB-COMMITTEE NO. 1—AIR SHAFTS AND AIR WAYS

J. C. Gaskill (*Chairman*), Asst. Cons. Engr., Consolidation Coal Co., Fairmont, W. Va.
C. H. Beidenmiller, Mgr., Glogora Coal Co., 705 First Natl. Bank Bldg., Huntington, W. Va.
J. H. Doughty, Mech. Engr., Lehigh & Wilkes-Barre Coal Co., 16 So. River St., Wilkes-Barre, Pa.
Robert Wallace, Supt., Pocahontas Fuel Co., Inc., Pocahontas, Va.
Jos. J. Walsh, Secretary of Mines, Pennsylvania Dept. of Mines, Harrisburg, Pa.

SUB-COMMITTEE NO. 2—MINE FAN INSTALLATION

G. E. Lyman (*Chairman*), Genl. Supt., Madison Coal Corpn., Glen Carbon, Ill.
H. G. Conrad, Genl. Mgr., American Coal Mining Co., Bicknell, Ind.
R. B. Fleming, Evansburg Coal Co., Colver, Pa.
E. B. Wagner, Lehigh Valley Coal Co., Wilkes-Barre, Pa.

SUB-COMMITTEE NO. 3—BOOSTER FANS

R. Dawson Hall (*Chairman*), Engineering Editor, Coal Age, 10th Ave. at 36th St., New York City.
Howard N. Eavenson, Pres., Howard N. Eavenson & Associates, 1302 Union Trust Bldg., Pittsburgh, Pa.
R. H. Moore, Genl. Mgr., C. A. Hughes & Co., Portage, Pa.
E. N. Zern, Editor, Mining Catalog, Keystone Cons. Publishing Co., 800 Penn Ave., Pittsburgh, Pa.

SUB-COMMITTEE NO. 4—MINE ATMOSPHERE

Thomas Chester (*Chairman*), Cons. Engr., 718 B. Copeland St., Pittsburgh, Pa.
Martin J. Lide, Cons. Engr., Woodward Bldg., Birmingham, Ala.
R. M. Perry, Genl. Supt., Moffat Coal Co., 504 Gas & Elec. Bldg., Denver, Colo.

Outside Coal Handling Equipment

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W. G. Duncan, Jr., Supt., W. G. Duncan Coal Co., Greenville, Ky.
H. H. Elkins, Supt. of Mines, Valley Camp Coal Co., St. Clairsville, Ohio.
M. A. Kendall, Chf. Engr., Stephens-Adamson Mfg. Co., Aurora, Ill.
Rudolf Kudlich, Asst. to Chf. Mech. Engr., U. S. Bureau of Mines, Washington, D. C.
John J. Moore, Dey & Maddock, 82d and Dennison Sts., Cleveland, Ohio.
F. G. Morris, Genl. Supt. of Coal Mines, Republic Iron & Steel Co., Sayreton, Ala.
G. H. Morse, Genl. Supt., Republic Iron & Steel Co., Oliver Bldg., Pittsburgh, Pa.
H. F. Nash, Vice Pres. & Genl. Mgr. of Sales, Oakdale Coal Co., Gas and Electric Bldg., Denver, Colo.
Warren R. Roberts, Pres., Roberts & Schaefer Co., Wrigley Bldg., Chicago, Ill.
H. D. Smith, Genl. Supt., American Coal Co. of Allegany County, McComas, W. Va.
C. K. Stahl, Asst. to Genl. Mgr., E. E. White Coal Co., Stotesbury, W. Va.
C. Law Watkins, Vice Pres., Pennsylvania Coal & Coke Corpn., Cresson, Pa.
F. W. Whiteside, Chf. Engr., Victor-American Fuel Co., Ernest & Cranmer Bldg., Denver, Colo.

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Harvey Conrad, Genl. Mgr., American Coal Mng. Co., Bicknell, Ind.
L. C. Ilsley, U. S. Bureau of Mines, 4800 Forbes St., Pittsburgh, Pa.
R. L. Kingsland, Genl. Supt., Power and Mechanical Dept., Consolidation Coal Co., Fairmont, W. Va.
Carl Lee, Elec. Engr., Peabody Coal Co., 1652 McCormick Bldg., Chicago, Ill.
Wm. Schott, Cons. Engr., Big Creek Coal Co. Chicago, Ill.
Henry M. Warren, Cons. Engr., Glen Alden Coal Co., 300 Jefferson Ave., Scranton, Pa.

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F. L. Stone, *Chairman*

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Graham Bright, Cons. Engr., Howard N. Eavenson & Associates, 1302 Union Trust Bldg., Pittsburgh, Pa.

OFFICERS AND COMMITTEES, 1925—(Continued)

Stephen H. Green, Pacific Coast Coal Co., Seattle, Wash.
O. P. Hood, Chf. Mech. Engr., U. S. Bureau of Mines, Washington, D. C.
J. T. Jennings, Power Engr., Philadelphia & Reading Coal & Iron Co., Pottsville, Pa.
R. L. Kingsland, Consolidation Coal Co., Fairmont, W. Va.
M. D. Kirk, Vesta Coal Co., Jones & Laughlin Bldg., Pittsburgh, Pa.
Chas. Legrand, Cons. Engr., Phelps Dodge Corpn., Douglas, Ariz.
Martin J. Lide, Cons. Engr., Woodward Bldg., Birmingham, Ala.
D. C. McKeehan, Chf. Elec., Union Pacific Coal Co., Rock Springs, Wyo.
J. A. Malady, Master Mech. & Elec. Engr., Hillman Coal & Coke Co., 2307 First National Bank Bldg., Pittsburgh, Pa.
A. J. Nicht, Jr., Engr., Hoisting Equipment, Allis-Chalmers Mfg. Co., Milwaukee, Wis.
W. C. Shunk, Stonega Coal & Coke Co., Big Stone Gap, Va.
Geo. S. Thompson, Chf. Elec. & Master Mech., Colorado Fuel & Iron Co., Pueblo, Colo.
C. D. Woodward, Chf. Elec. Engr., Anaconda Copper Mining Co., 514 Hennessy Bldg., Butte, Mont.

Mine Timbering

R. L. Adams, *Chairman*

SUB-COMMITTEE NO. 1—GENERAL MINE TIMBERING, SIMPLIFICATION ON GRADES AND NAMES

J. R. Sharp (Chairman), care of C. F. Kurtz Co., Rock Island, Ill.
Newell G. Alford, Vice Pres., Howard N. Eavenson & Associates, 1302 Union Trust Bldg., Pittsburgh, Pa.
R. W. Austin, Austin & Wood, North 3rd St., Clearfield, Pa.
J. R. Crowe, Jr., Pres., Crowe Coal Co., Dwight Bldg., Kansas City, Mo.
D. F. Holtman, Construction Engr., National Lumber Mfgrs. Assn., 402 Transportation Bldg., Washington, D. C.
G. A. Knox, Supt., Gunn-Quealey Coal Co., Quealy, Wyoming.
Ernest M. Merrill, Pres., Merrill-Ferguson Engineering Co., 506 Kanawha Bank & Trust Bldg., Charleston, W. Va.
Chas. N. Perrin, Chairman, Rules Committee, National Hardwood Lumber Assn., Bank of Wisconsin Bldg., Madison, Wis.
George S. Rice, Chf. Mng. Engr., U. S. Bureau of Mines, Washington, D. C.
Geo. T. Stevens, Chf. Engr., Clinchfield Coal Corpn., Dante, Va.

SUB-COMMITTEE NO. 2—PRESERVATION OF MINE TIMBERS

Geo. M. Hunt (*Chairman*), In Charge of Wood Preservation Section, Forest Products Laboratory, Madison, Wis.
W. L. Affelder, Asst. to Pres., Hillman Coal and Coke Co., 2306 First Natl. Bank Bldg., Pittsburgh, Pa.
R. W. Austin, Austin & Wood, North 3rd St., Clearfield, Pa.
M. H. Sellers, Chicago, Wilmington & Franklin Coal Co., Carbondale, Ill.
D. A. Stout, Mgr., Fuel Dept., Colorado Fuel & Iron Co., Pueblo, Colo.

SUB-COMMITTEE NO. 3—USE OF CONCRETE IN MINE TIMBERING

Newell G. Alford (*Chairman*), Vice-Pres., Howard N. Eavenson & Associates, 1302 Union Trust Bldg., Pittsburgh, Pa.
B. C. Collier, Pres., Cement-Gun Co., Inc., Allentown, Pa.
W. R. Peck, Chf. Engr., Black Diamond Collieries, Coal Creek, Tenn.
H. S. Wright, Engr., Structural Bureau, Portland Cement Assn., 111 W. Washington St., Chicago, Ill.

SUB-COMMITTEE NO. 4—USE OF STRUCTURAL STEEL FOR MINE TIMBERING

D. W. Blaylock, Mng. Engr., Madison Coal Corpn., Glen Carbon, Ill.
J. M. Clark, Jr., Asst. Engr., E. E. White Coal Co., Glen White, W. Va.
R. V. Clay, Wheeling & Lake Erie Coal Mining Co., Cleveland, Ohio.
Robert A. Marble, Carnegie Steel Co., Carnegie Bldg., Pittsburgh, Pa.
Geo. A. Richardson, Mgr., Technical Publicity Dept., Bethlehem Steel Co., Bethlehem, Pa.

SUB-COMMITTEE NO. 5—SALVAGE OF MINE TIMBER

George T. Stevens (Chairman), Chf. Engr., Clinchfield Coal Corpn., Dante, Va.
Davis Read, Chf. Engr., West Kentucky Coal Co., Sturgis, Ky.
A. B. Walter, Chf. Engr., O'Gara Coal Co., Harrisburg, Ill.

METAL MINING BRANCH

General Committee

Charles A. Mitke (*Chairman*), Cons. Mng. Engr., Phoenix, Ariz.
Frank Ayer, Mgr., Moctezuma Copper Co., Nacozari, Sonora, Mexico.
Wm. Conibear, Safety Inspector, Cleveland-Cliffs Iron Co., Ishpeming, Mich.
Arthur Crowfoot, Mill Supt., Phelps Dodge Corpn., Morenci, Ariz.
William B. Daly, Genl. Mgr. of Mines, Anaconda Copper Mining Co., 504 Hennessy Bldg., Butte, Mont.
Lucien Eaton, Supt., Ishpeming District, Cleveland-Cliffs Iron Co., Ishpeming, Mich.
Wm. H. Gallagher, Jr., Chf. Mng. Engr., Pickands-Mather & Co., 700 Sellwood Bldg., Duluth, Minn.
H. C. Goodrich, Chf. Engr., Utah Copper Co., Kearns Bldg., Salt Lake City, Utah.
T. O. McGrath, Asst. Mgr., Shattuck-Arizona Copper Co., Bisbee, Ariz.
Dr. Frank H. Probert, Dean, College of Mining, University of California, Berkeley, Calif.
Philip D. Wilson, American Metal Co., Ltd., 61 Broadway, New York City.

Mine Drainage

Wm. H. Gallagher, Jr., *Chairman*

H. T. Abrams, Dept. Mgr. of Air Lift Pumps and "Calyx" Drills, Ingersoll-Rand Co., 11 Broadway, New York City.
G. L. Kollberg, Mgr., Pumping Engine Dept., Allis-Chalmers Mfg. Co., Milwaukee, Wis.
O. D. McClure, Chief Mech. Engr., Cleveland-Cliffs Iron Co., Ishpeming, Mich.
Charles Mendelsohn, Master Mechanic, Old Dominion Company, Globe, Ariz.
W. A. Rankin, Elec. Engr., Copper Range Company, Painesdale, Mich.
W. N. Tanner, Chief Engr., Anaconda Copper Mining Co., 514 Hennessy Bldg., Butte, Mont.
C. D. Woodward, Chief Elec. Engr., Anaconda Copper Mining Co., 514 Hennessy Bldg., Butte, Mont.

Drilling Machines and Drill Steel

Frank Ayer, *Chairman*

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B. F. Tillson (*Chairman*), Asst. Supt., New Jersey Zinc Co., Franklin, N. J.
L. C. Bayles, Designing Engr., Rock Drill Dept., Ingersoll-Rand Co., Phillipsburg, N. J.
Arthur B. Foote, Genl. Mgr., North Star Mines Co., Grass Valley, California.
J. A. Fulton, Idaho-Maryland Mines Co., Grass Valley, California.
Roy H. Marks, Efficiency Engr., United Verde Extension Mng. Co., Jerome, Arizona.
R. T. Murrill, Efficiency Engr., St. Joseph Lead Co., Rivermines, Mo.
R. A. Scott, Sales Mgr., Denver Rock Drill Mfg. Co., 39th and Williams St., Denver, Colo.
W. C. Scott, Supt., Morenci Branch, Phelps Dodge Corpn., Metcalf, Ariz.
George A. Shaw, Mine Supt., Talache Mines, Inc., Talache, Idaho.
H. T. Walsh, Vice Pres., Sullivan Machinery Co., Peoples Gas Bldg., Chicago, Ill.

SUB-COMMITTEE NO. 2—DRILL STEEL

Norman B. Braly, Genl. Mgr., North Butte Mng. Co., Butte, Mont.
E. G. Deane, Mgr., Superior & Boston Copper Co., Copper Hill, Ariz.
O. J. Egleston, Mgr., U. S. Smelting, Refining & Mining Co., Kennett, Calif.
C. S. Elayer, Clouderoft, New Mexico.
E. F. Hastings, Salesman, Ingersoll-Rand Co. of Texas, Dominion Hotel, Globe, Ariz.
Chas. S. Hurter, Tech. Representative, E. I. du Pont de Nemours & Co., Inc., 5104 Du Pont Bldg., Wilmington, Del.
Charles B. Officer, Asst. to Pres., Sullivan Machinery Co., 122 So. Mich. Ave., Chicago, Ill.
Henry S. Potter, Managing Director, Henry S. Potter, Ltd., 26 Cullinan Bldg., Johannesburg, South Africa.
Ocha Potter, Supt., Ahmeek-Kearsarge Br., Calumet & Hecla Mng. Co., Ahmeek, Mich.
Chas. A. Smith, Asst. Genl. Mgr., Ray Consolidated Copper Co., Ray, Ariz.
A. S. Uhler, Mgr., Rock Drill Sales, Ingersoll-Rand Co., 11 Broadway, New York City.
M. van Siclen, Engr., In Charge of Mining Research, U. S. Bureau of Mines, Washington, D. C.
Bruce C. Yates, Supt., Homestake Mining Co., Lead, South Dakota.

SUB-COMMITTEE NO. 3—METHODS OF SHARPENING DRILL STEEL

W. R. Wade (Chairman), Cons. Engr., 1230 Geary St., San Francisco, Calif.
George H. Gilman, Pres., Gilman Mfg. Co., E. Boston, Mass.
Chas. E. Lees, Supt., Iron Cap Copper Co., Copper Hill, Ariz.
Frank W. McLean, United Verde Copper Co., Jerome, Ariz.
Arthur Notman, Cons. Engr., 170 Broadway, New York City.
W. H. Schacht, Genl. Mgr., Copper Range Co., Painesdale, Mich.
H. W. Seamon, Supt., Comstock Merger Mines, Inc., Virginia City, Nevada.

Underground Transportation

William B. Daly, *Chairman*

Thos. C. Baker, Genl. Mgr., The Comstock Merger Mines Co., Virginia City, Nevada.
George H. Booth, Mech. Engr., Inspiration Cons. Co., Inspiration, Arizona.
R. R. Boyd, Asst. Supt., Mine Dept., Copper Queen Branch, Phelps Dodge Corpn., Bisbee, Arizona.
D. S. Calland, Managing Director, Compania de Real del Monte de Pachuca, Pachuca, Hidalgo, Mexico.
W. R. Crane, Supt., Southern Station, U. S. Bureau of Mines, New Federal Bldg., Birmingham, Alabama.
W. Val DeCamp, Genl. Mine Supt., United Verde Copper Co., Jerome, Arizona.
Robert H. Dickson, Supt., 85 Branch, Calumet & Arizona Mining Co., Valedon, New Mexico.
Stanly A. Easten, Mgr., Bunker Hill & Sullivan Mng. & Concentrating Co., Kellogg, Idaho.
H. T. Hamilton, Cons. Mng. Engr., 1408 California Commercial Union Bldg., San Francisco, California.
F. H. Hayes, Mine Supt., Copper Queen Branch, Phelps Dodge Corpn., Bisbee, Arizona.
R. E. Howe, Genl. Supt., Cananea Cons. Copper Co., Cananea, Sonora, Mexico.
John Kiddie, Mine Supt., Phelps Dodge Corpn., Morenci, Arizona.
C. A. Lantz, Genl. Mgr., Compania de Santa Gertrudis, S. A., Apartado No. 1, Pachuca, Hidalgo, Mexico.
E. M. Norris, Asst. Genl. Supt. of Mines, Anaconda Copper Mining Co., Butte, Mont.
Thomas K. Scott, Supt., Munro Iron Mining Co., Iron River, Mich.
Andover Syverson, Prescott, Arizona.

Fire-Fighting Equipment

Wm. Conibear, *Chairman*

SUB-COMMITTEE NO. 1—CONTROL OF VENTILATING EQUIPMENT DURING MINE FIRES

Orr Woodburn (*Chairman*), Safety Engr., Globe-Miami District, Globe, Ariz.
Guy J. Johnson, Mgr., Golden Gate Mine and Timber Co., Atlantic City, Wyo.
H. J. Rahilly, Supt., Mine Fire and Hydraulic Filling Dept., Anaconda Copper Mining Co., Butte, Mont.
Albert Fallon, Safety Inspector, The Old Dominion Co., Globe, Ariz.
J. T. Young, Safety Inspector, Arizona Copper Company, Morenci, Ariz.

SUB-COMMITTEE NO. 2—FIRE HOSE

R. H. Seip (*Chairman*), New Jersey Zinc Co., Franklin, N. J.
C. W. Moon, Safety Inspector, Phelps Dodge Corpn., Bisbee, Ariz.
B. O. Pickard, District Engineer, U. S. Bureau of Mines, Berkeley, Calif.

Mining Excavating Equipment—Exclusive of Dredges

H. C. Goodrich, *Chairman*

H. G. S. Anderson, Mng. and Met. Engr., Rolla, Mo.
H. C. Bellinger, Vice Pres., Chile Exploration Co., 25 Broadway, New York City.
Michael Curley, Genl. Supt., New Cornelia Copper Co., Ajo, Ariz.
H. T. Gracely, Adv. Mgr., Marion Steam Shovel Co., Marion, Ohio.
C. B. Lakenan, Genl. Mgr., Nevada Cons. Copper Co., McGill, Nev.
W. J. Lester, Pres., Kentucky Washed Coal Co., Greenville, Ky.
Geo. Mieyr, Supt., Sacramento Hill, Copper Queen Branch, Phelps Dodge Corpn., Bisbee, Ariz.
G. A. Murfey, Treas. and Chief Engr., The Browning Co., 16226 Waterloo Rd., Cleveland, Ohio.
Henry B. Oatley, Vice Pres., Superheater Co., 17 E. 42nd St., New York City.
Thos. A. Snyder, Bucyrus Co., South Milwaukee, Wis.
Robt. E. Tally, Genl. Mgr., United Verde Copper Co., Jerome, Ariz.
J. C. Wheat, Development Engr., Industrial Works, Bay City, Mich.
Charles S. Whitaker, Vice Pres., Winston Bros. Co., 801 Globe Bldg., Minneapolis, Minn.

Mine Ventilation

Chas. A. Mitke, *Chairman* (*Temporary*)

Robt. N. Bell, Cons. Mng. Engr., Box 1339, Boise, Idaho.
Walter C. Browning, Genl. Mgr., Magma Copper Co., Superior, Ariz.
O. K. Dyer, Mgr., Small Blower Dept., Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
Daniel Harrington, 507 Newhouse Bldg., Salt Lake City, Utah.
E. T. Lednum, Mgr., E. I. du Pont de Nemours & Co., Inc., 406 Ideal Bldg., Denver, Colo.
C. E. Legrand, Cons. Engr., Phelps Dodge Corpn., Douglas, Ariz.
F. W. Maclennan, Genl. Mgr., Miami Copper Co., Miami, Ariz.
Don M. Rait, Asst. Supt. of Mines, Calumet and Arizona Mining Co., Warren, Ariz.
A. S. Richardson, Ventilation Engr., Anaconda Copper Mining Co., Butte, Mont.
Wm. A. Rowe, Chief Engr., American Blower Co., 6004 Russell St., Detroit, Mich.
A. C. Stoddard, Chief Mine Engr., Inspiration Cons. Copper Co., Inspiration, Ariz.
F. L. Stone, Industrial Engineering Dept., General Electric Co., Schenectady, N. Y.
E. B. Williams, Mgr., Marine Dept., B. F. Sturtevant Co., Hyde Park, Boston, Mass.

OFFICERS AND COMMITTEES, 1925—(Concluded)

Mechanical Loading Underground

Lucien Eaton, *Chairman*

SUB-COMMITTEE NO. 1—LOADING MACHINES FOR TUNNELS, LARGE DRIFTS AND STOPES

Douglas C. Corner (*Chairman*), St. Louis Power Shovel Co., 320 Chemical Bldg., St. Louis, Mo.
H. E. Billington, Vice Pres. for Sales, The Thew Shovel Co., Lorain, Ohio.
J. H. Hensley, Mine Supt., Miami Copper Co. Miami, Ariz.
H. DeWitt Smith, New York Trust Co., 109 Broadway, New York City.
H. G. Washburn, Mng. Engr., American Smelting & Refining Co., McCormick Bldg., Salt Lake City, Utah.
Mr. William Whaley, Genl. Mgr., Myers-Whaley Co., Knoxville, Tenn.

SUB-COMMITTEE NO. 2—LOADING MACHINES FOR SMALL DRIFTS AND FOR WORK ON SUB-LEVELS

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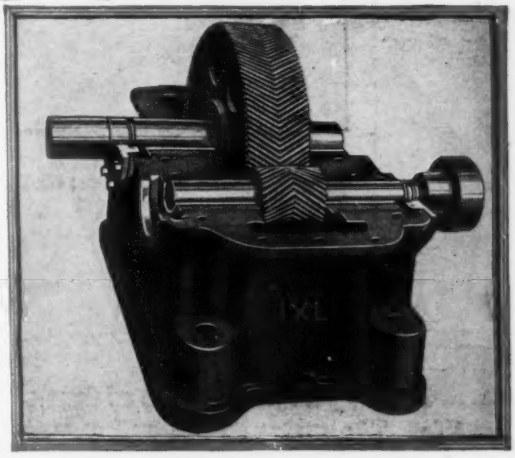

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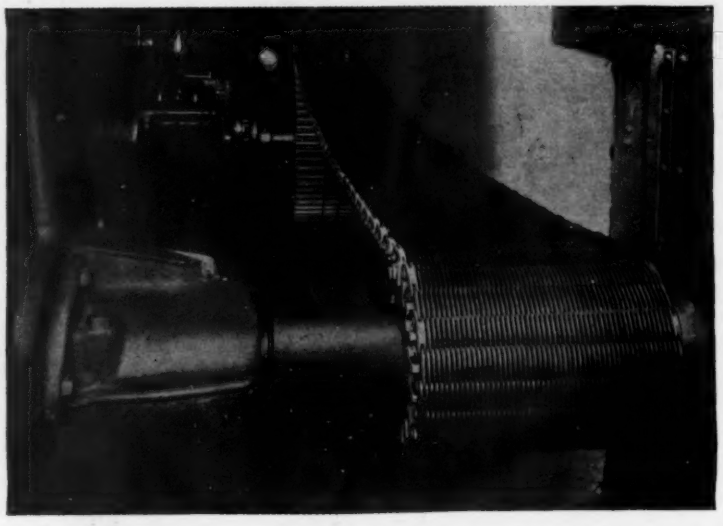

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